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PCC

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COVER is from SOLOWORKS Module No. 2103. See SOLOWORKS Newsletter No. 36 in this issue, pages 2 – 5.

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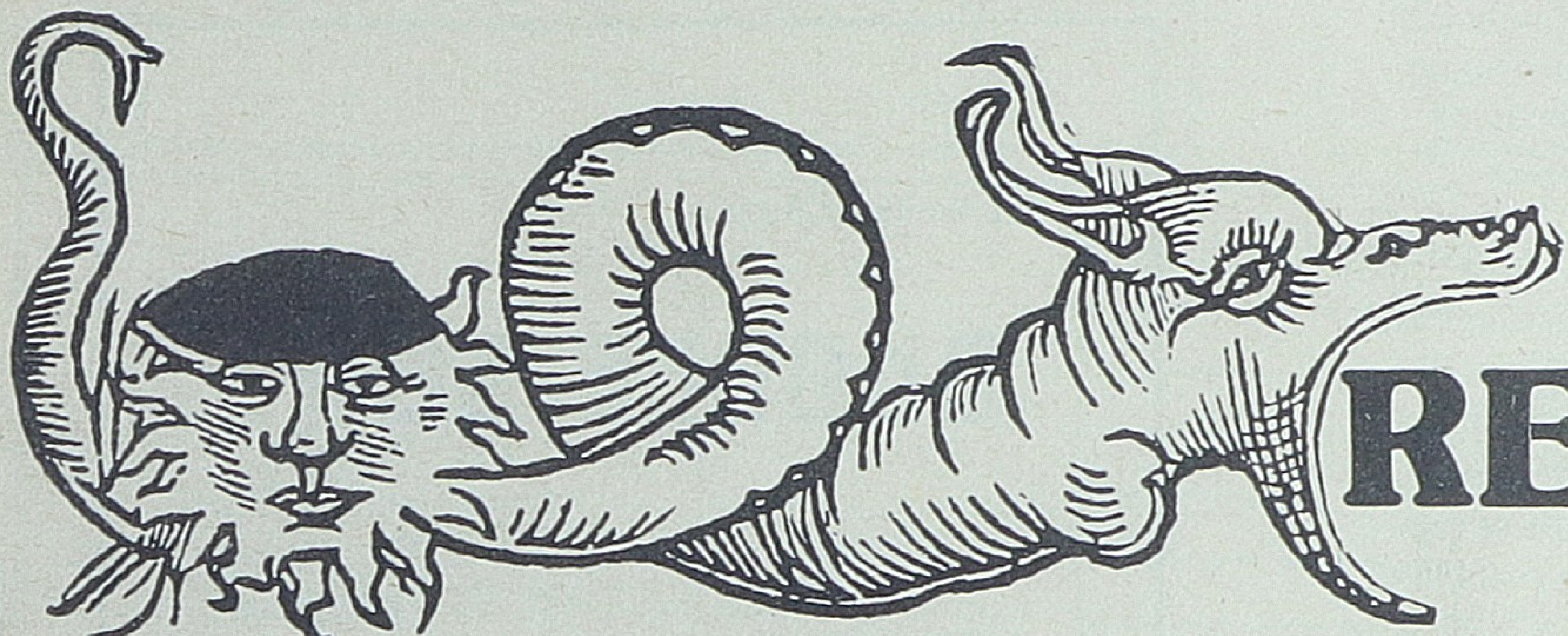
† TINY BASIC NEWSLETTER will go out in late January. It will contain a description and octal code for EXTENDED TINY BASIC by Dick Whipple and John Arnold.



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ZIP

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Report From Soloworks to PCC Readers

Should your school join the computer movement? Will spending money on hardware make for better learning? We think most people can better arrive at answers to these questions by considering the following experiment:

A phonograph is placed in a room with a small group of listeners. A well-made recording of a Verdi opera is placed on the turntable, and for an hour or so the listeners concentrate on everything they hear. We then ask the question: What have the listeners received?

The answer is that the amount, subtlety, and utility of information received by each person is *radically* dependent on the history of experiences (or "cultural background") each person brings to the listening room. A listener raised in Napoli within a community that lived and breathed opera, will actually "hear" things (it's of course a psycho-acoustic phenomenon) that are beyond comprehension for other listeners. Even more startling will be the depth of information absorbed by a listener who has been a creative worker in the field of opera, whether at the composing, performing, or production levels. At the other extreme, a listener who has had no part of the operatic culture, will literally be hearing mostly "noise" ("yelling and screaming" in the words of one person). *Efforts aimed at perfecting either the record or record player will not substantially change this situation.*

Our imagined experiment serves as a rather accurate description of the model that underlies the Soloworks project's perception of human learning. The experiment reveals three fundamental elements in the learning process, and makes clear the remarkable epistatic interactions that can take place between them. These three elements can be described in terms of the adjectives "transmittal", "experiential", and "creative":

Transmittal elements are those that attempt to pass on ideas, facts, skills, etc. from person(s) to person(s). As our experiment suggests, this information can be both limited and cryptic, and heavily immersed in "noise". But when we add a *human* receiver to the system, there now arises the possibility of retrieving, reconstructing, and even creating content from the original noisy signal, provided the appropriate *experiential* and *creative* faculties of that human listener have been enabled.

The primary goal of the Soloworks project has been to invent new and effective mechanisms for enabling these faculties in young students. In particular, we have been investigating the potential of state-of-the-art computer-based technology for providing invigorating sets of experiences that will sensitize students as expert listeners in a laboratory-based mathematics curriculum. We have also used this same technology to support students in creative work, so that they will not only get maximum benefit from the transmittal elements of the curriculum, but will themselves eventually contribute to the growing body of knowledge from which transmittal mode draws.

How does it work? That's one question the readers of PCC don't need answered, if they've had a chance to use computers in a setting that isn't too hemmed in by lack of imagination. Some idea of how it's working for us is given by the "curriculum" topics we've developed as shown here in graphical form. *Most* of these ideas came from working with high school students who were interested enough in these topics to spend considerable time with them as projects. We can guarantee that these students have become expert listeners ("receivers") in the "transmittal" course we teach. We have found that the theory described here works out to be quite a sensational pedagogical technique, and recommend it as an idea worth trying.

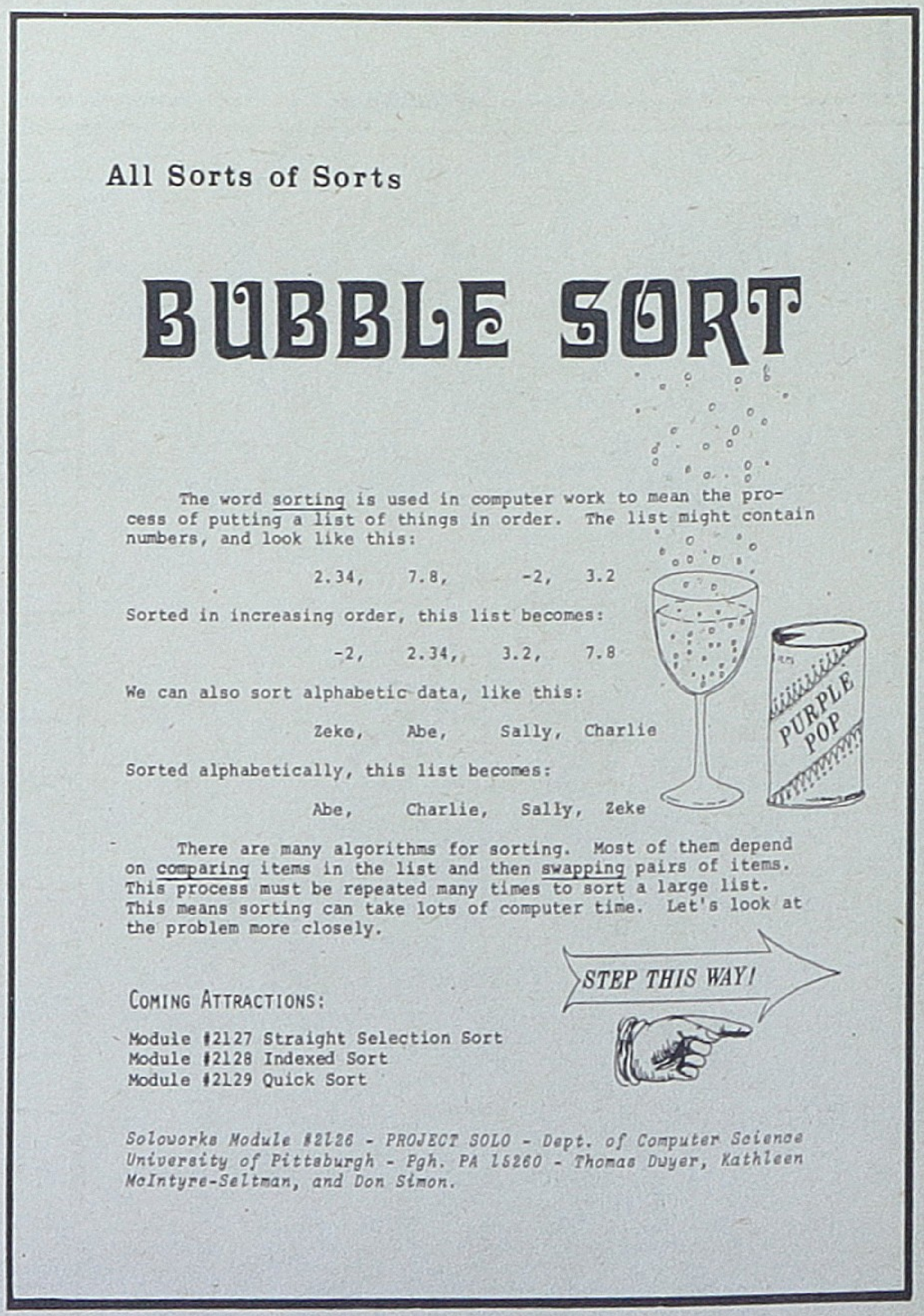
Note: The curriculum and sample modules shown are experimental only. Do *not* write for copies – we are not able to respond at present . . . sorry (not our decision).

About the SOLOWORKS CURRICULUM

The Soloworks curriculum development has been based on a "top down" approach, that is on the generation of curriculum materials by a process that starts with fairly advanced ideas, and immediately tries to capture them in the form of lab-oriented curriculum modules. As we write these modules, we discover that certain pre-requisites for both content and experience arise. This then suggests other modules. The process can be repeated to generate other modules at further levels of simplification, but it can also work in the opposite direction. For example, a module on single-server queuing theory has pointed "downward" to suggest new content. It has been organized to permit groupings in up to nine new one-semester courses, and to show how our lab-oriented approach relates to the great classical ideas of mathematics.

Our current working version of this curriculum together with sample first pages from representative curriculum modules is shown on page 5. The nine possible courses can be located by grouping together master topics with code numbers starting with A, C, EC, D, ED, S ES, M and EM.

Our intention in focusing on discrete curriculum modules (rather than "continuous" textbooks) has been to maintain flexibility. We felt that the innovative nature of our program mandated keeping an open mind about the structure of a lab-oriented curriculum, and that freezing a sequence at this time would be a mistake. This judgement has proved to have been a good one. In addition to allowing us to add new ideas as we discovered them, the modular approach has invited rearrangement and/or extension and/or deletion, by the teachers at our lab.


PURPLE POP
STEP THIS WAY!

All Sorts of Sorts

BUBBLE SORT

The word sorting is used in computer work to mean the process of putting a list of things in order. The list might contain numbers, and look like this:

2.34, 7.8, -2, 3.2

Sorted in increasing order, this list becomes:

-2, 2.34, 3.2, 7.8

We can also sort alphabetic data, like this:

Zeke, Abe, Sally, Charlie

Sorted alphabetically, this list becomes:

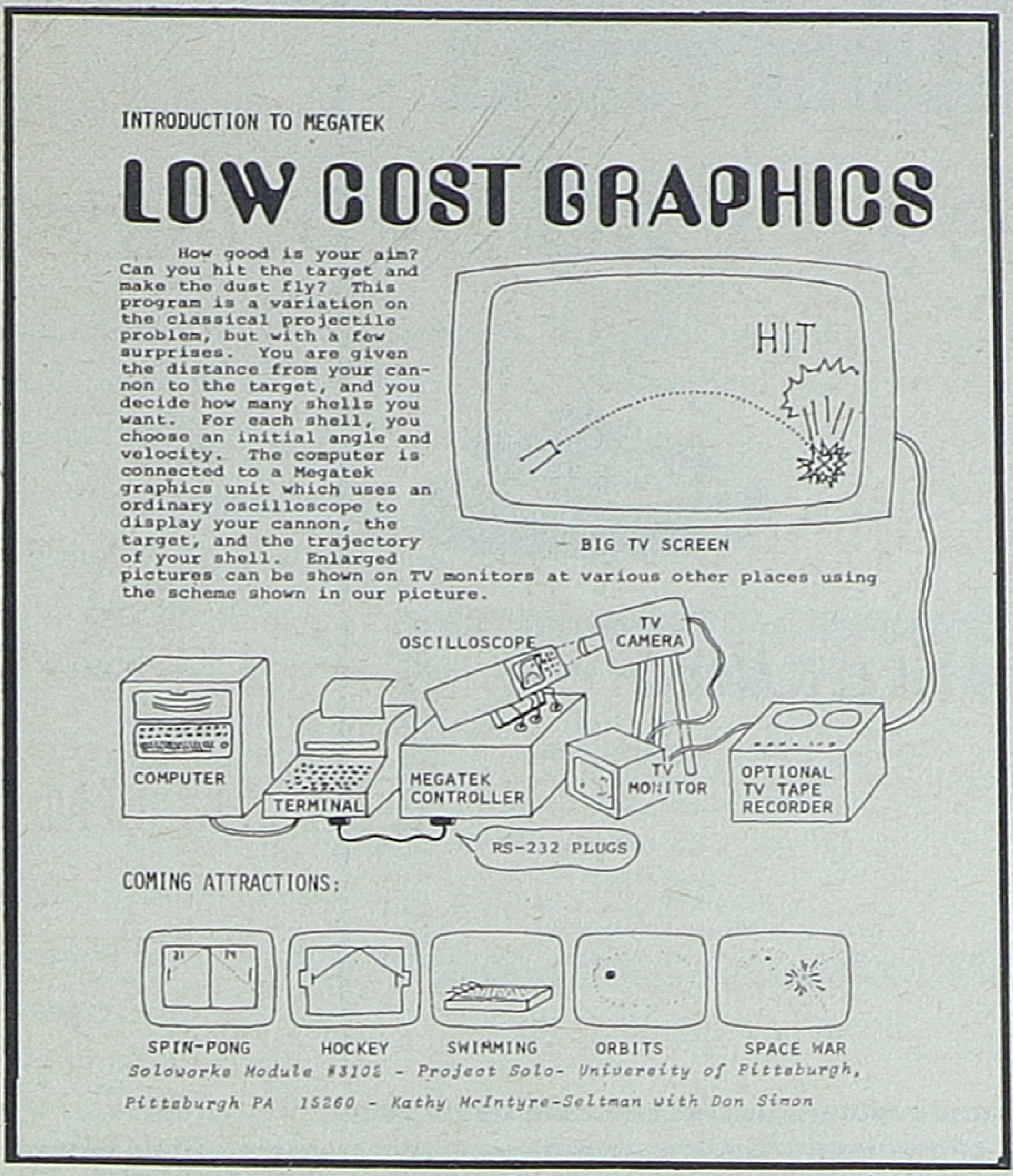
Abe, Charlie, Sally, Zeke

There are many algorithms for sorting. Most of them depend on comparing items in the list and then swapping pairs of items. This process must be repeated many times to sort a large list. This means sorting can take lots of computer time. Let's look at the problem more closely.

COMING ATTRACTIONS:

Module #2127 Straight Selection Sort
Module #2128 Indexed Sort
Module #2129 Quick Sort

Soloworks Module #2126 - PROJECT SOLO - Dept. of Computer Science University of Pittsburgh - Pgh. PA 15260 - Thomas Dwyer, Kathleen McIntyre-Seltman, and Don Simon.



INTRODUCTION TO MEGATEK

LOW COST GRAPHICS

How good is your aim? Can you hit the target and make the dust fly? This program is a variation on the classical projectile problem, but with a few surprises. You are given the distance from your cannon to the target, and you decide how many shells you want. For each shell, you choose an initial angle and velocity. The computer is connected to a Megatek graphics unit which uses an ordinary oscilloscope to display your cannon, the target, and the trajectory of your shell. Enlarged pictures can be shown on TV monitors at various other places using the scheme shown in our picture.

COMING ATTRACTIONS:

Soloworks Module #3102 - Project Solo- University of Pittsburgh, Pittsburgh PA 15260 - Kathy McIntyre-Seltman with Don Simon

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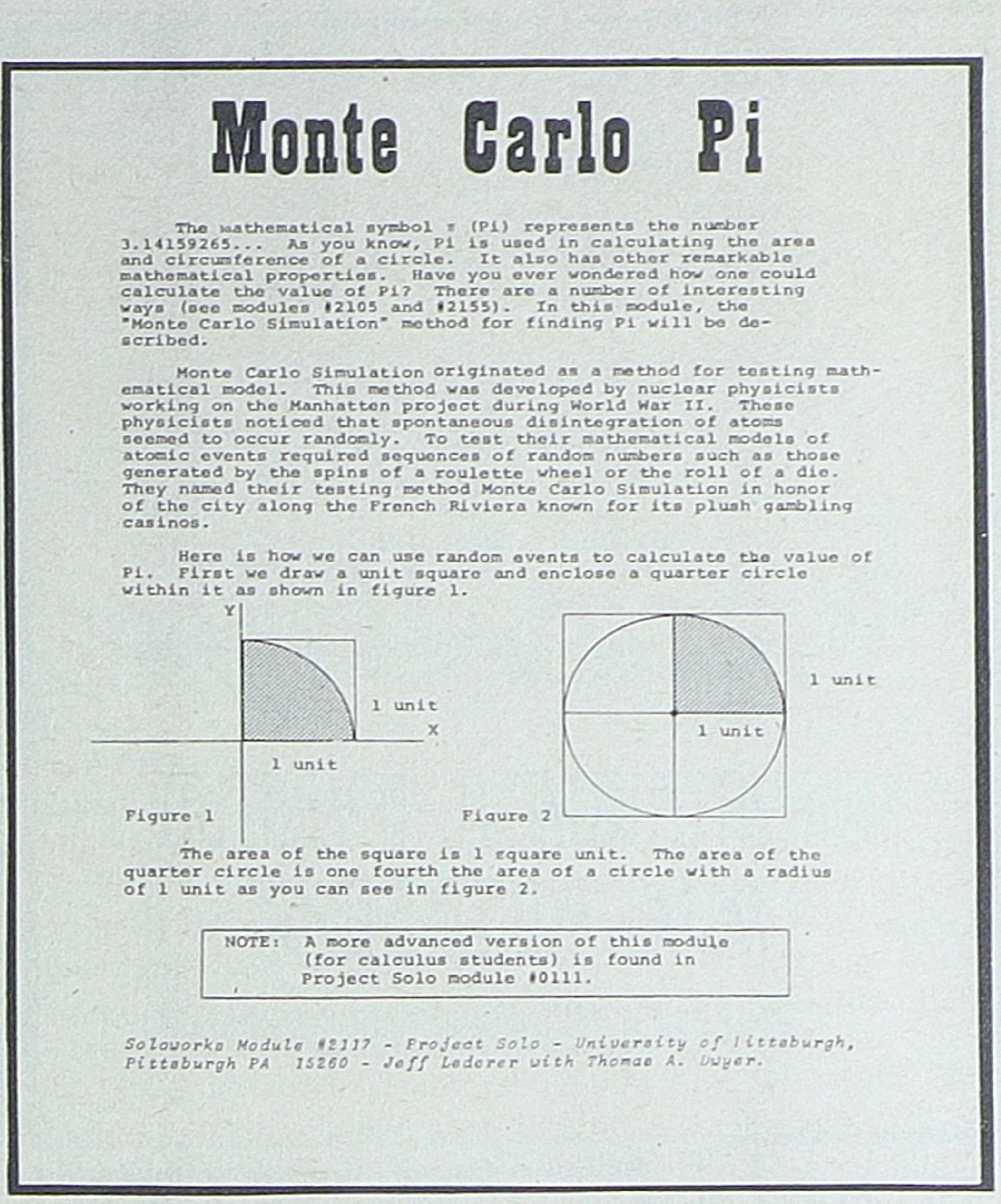


Monte Carlo Pi

The mathematical symbol π (Pi) represents the number 3.14159265... As you know, Pi is used in calculating the area and circumference of a circle. It also has other remarkable mathematical properties. Have you ever wondered how one could calculate the value of Pi? There are a number of interesting ways (see modules #2105 and #2155). In this module, the "Monte Carlo Simulation" method for finding Pi will be described.

Monte Carlo Simulation originated as a method for testing mathematical model. This method was developed by nuclear physicists working on the Manhatten project during World War II. These physicists noticed that spontaneous disintegration of atoms seemed to occur randomly. To test their mathematical models of atomic events required sequences of random numbers such as those generated by the spins of a roulette wheel or the roll of a die. They named their testing method Monte Carlo Simulation in honor of the city along the French Riviera known for its plush gambling casinos.

Here is how we can use random events to calculate the value of Pi. First we draw a unit square and enclose a quarter circle within it as shown in figure 1.

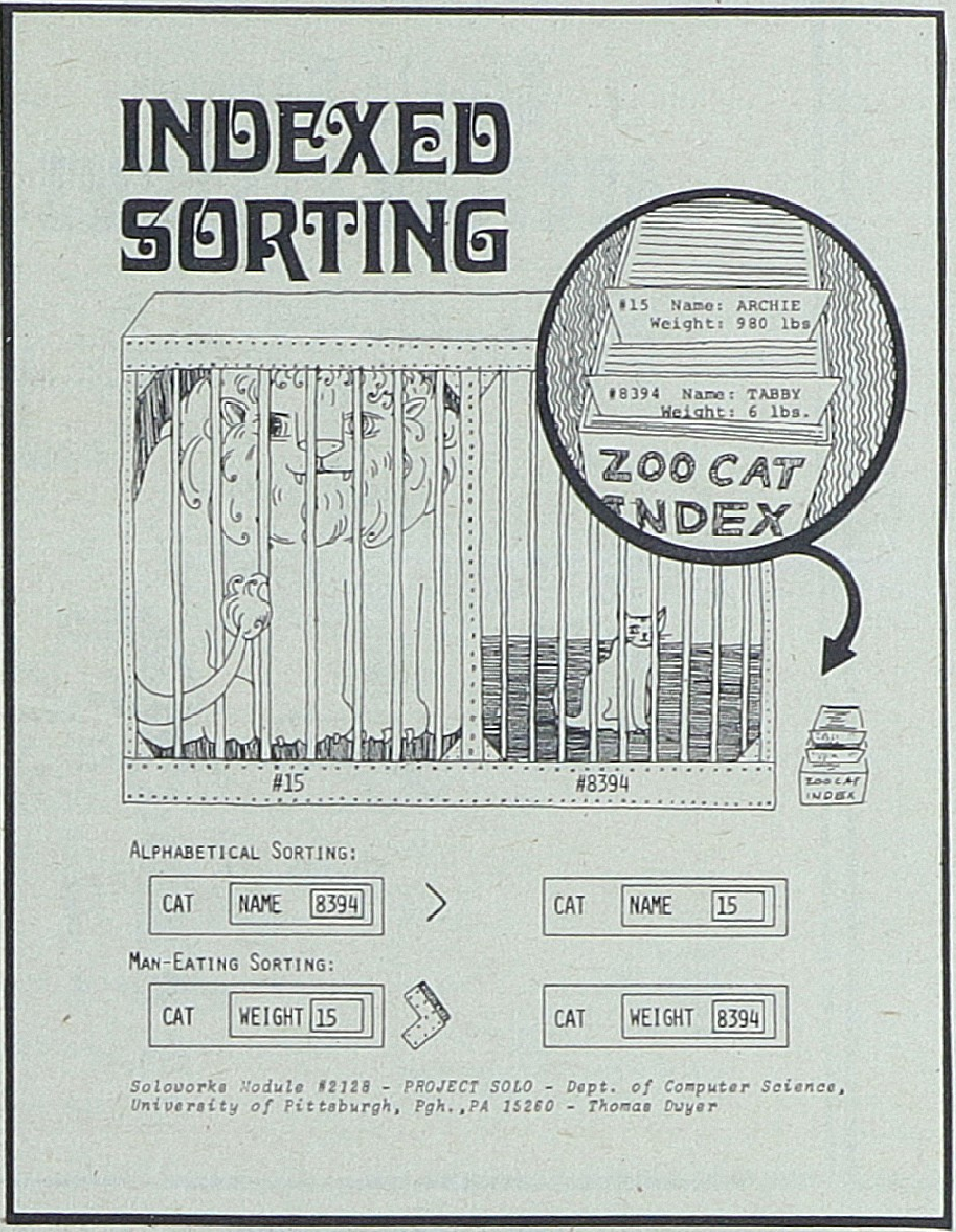
Figure 1

Figure 2

The area of the square is 1 square unit. The area of the quarter circle is one fourth the area of a circle with a radius of 1 unit as you can see in figure 2.

NOTE: A more advanced version of this module (for calculus students) is found in Project Solo module #0111.

Soloworks Module #2117 - Project Solo - University of Pittsburgh, Pittsburgh PA 15260 - Jeff Lederer with Thomas A. Dwyer.



INDEXED SORTING

ALPHABETICAL SORTING:

CAT NAME 8394 > CAT NAME 15

MAN-EATING SORTING:

CAT WEIGHT 15 CAT WEIGHT 8394

Soloworks Module #2128 - PROJECT SOLO - Dept. of Computer Science, University of Pittsburgh, Pgh.,PA 15260 - Thomas Dwyer

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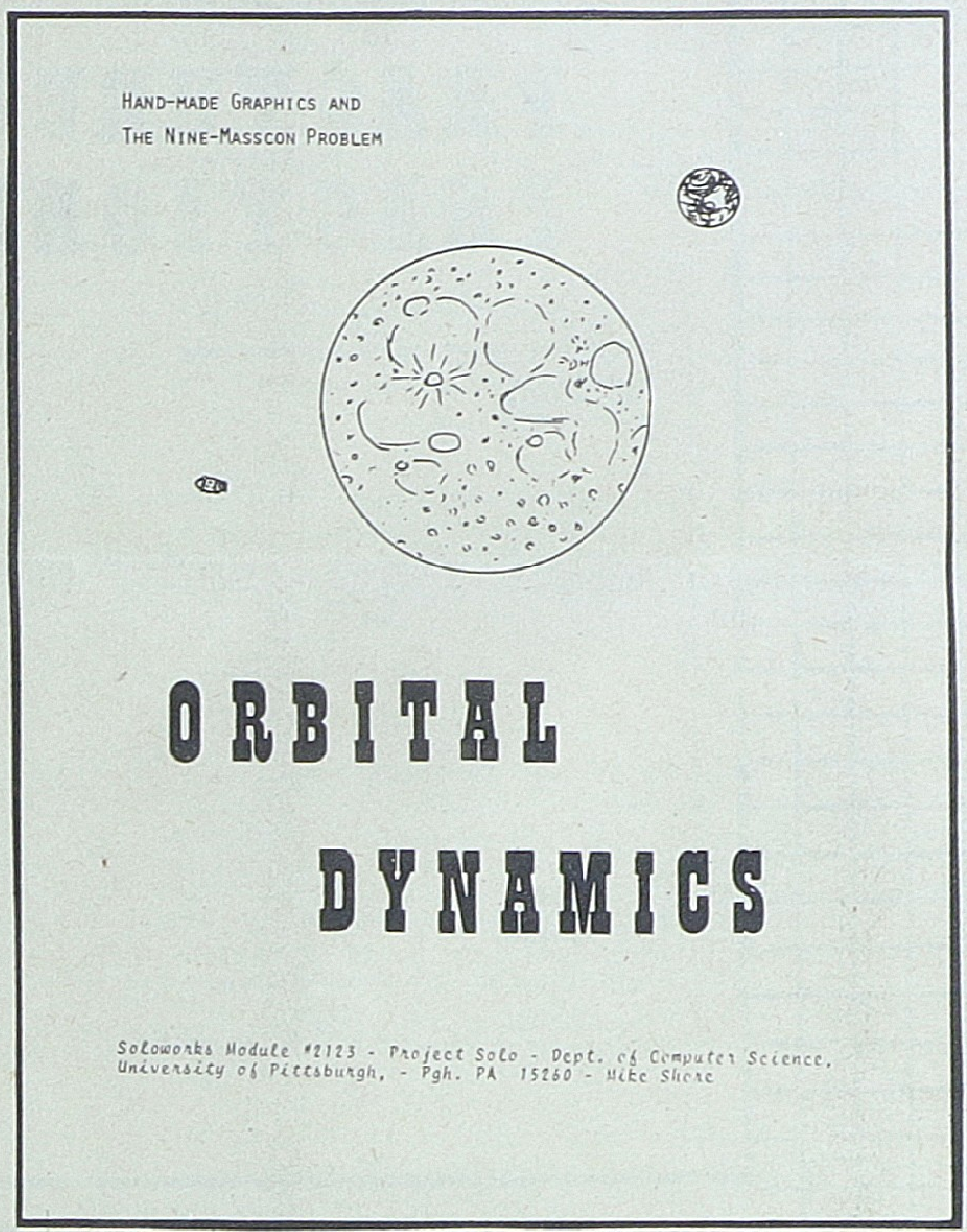

HAND-MADE GRAPHICS AND
THE NINE-MASSCON PROBLEM

ORBITAL DYNAMICS

Soloworks Module #2123 - Project Solo - Dept. of Computer Science, University of Pittsburgh, - Pgh. PA 15260 - Mike Shore

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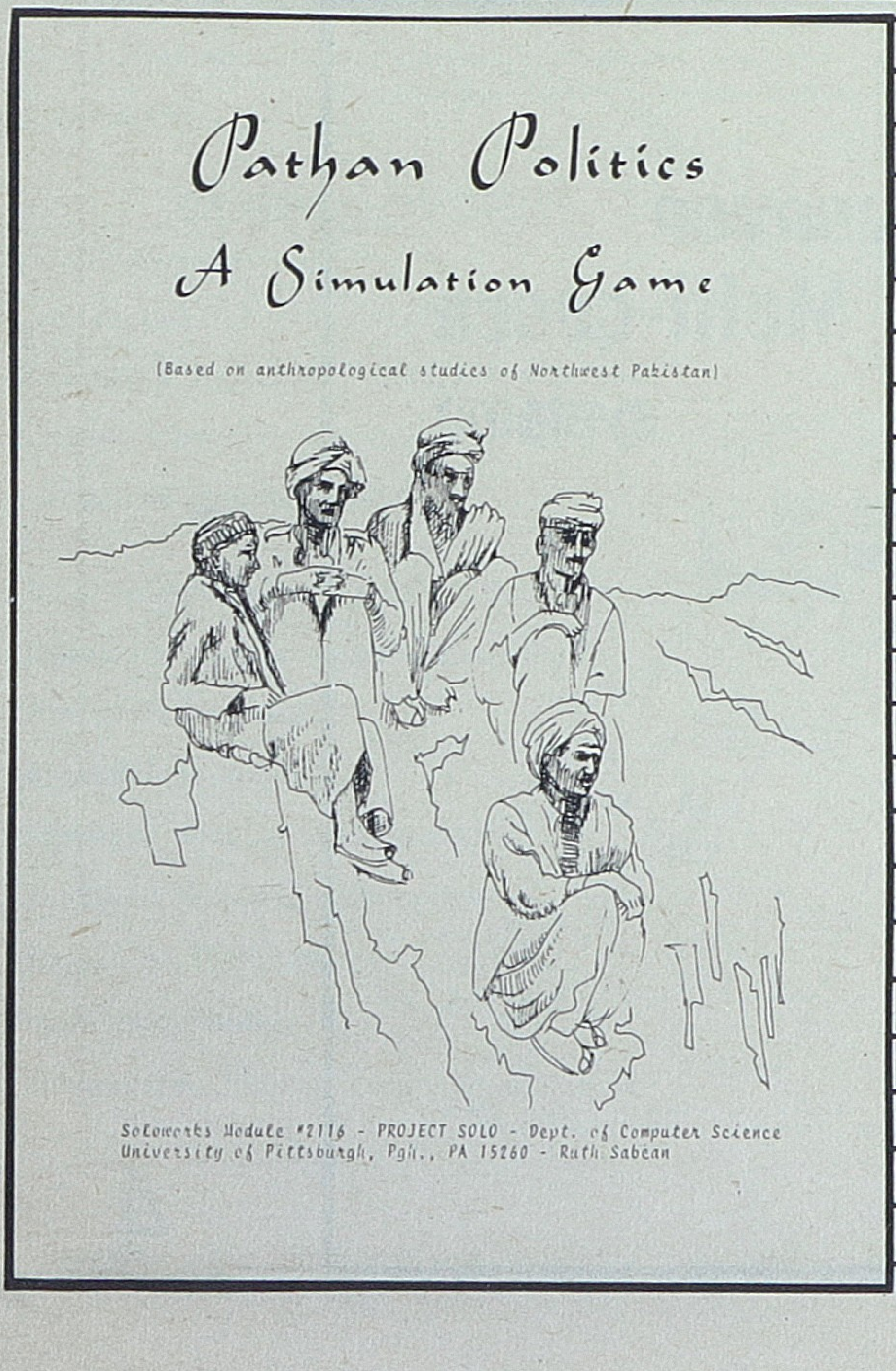

Pathan Politics
A Simulation Game

(Based on anthropological studies of Northwest Pakistan)

Soloworks Module #2116 - PROJECT SOLO - Dept. of Computer Science University of Pittsburgh, Pgh., PA 15260 - Ruth Sabean

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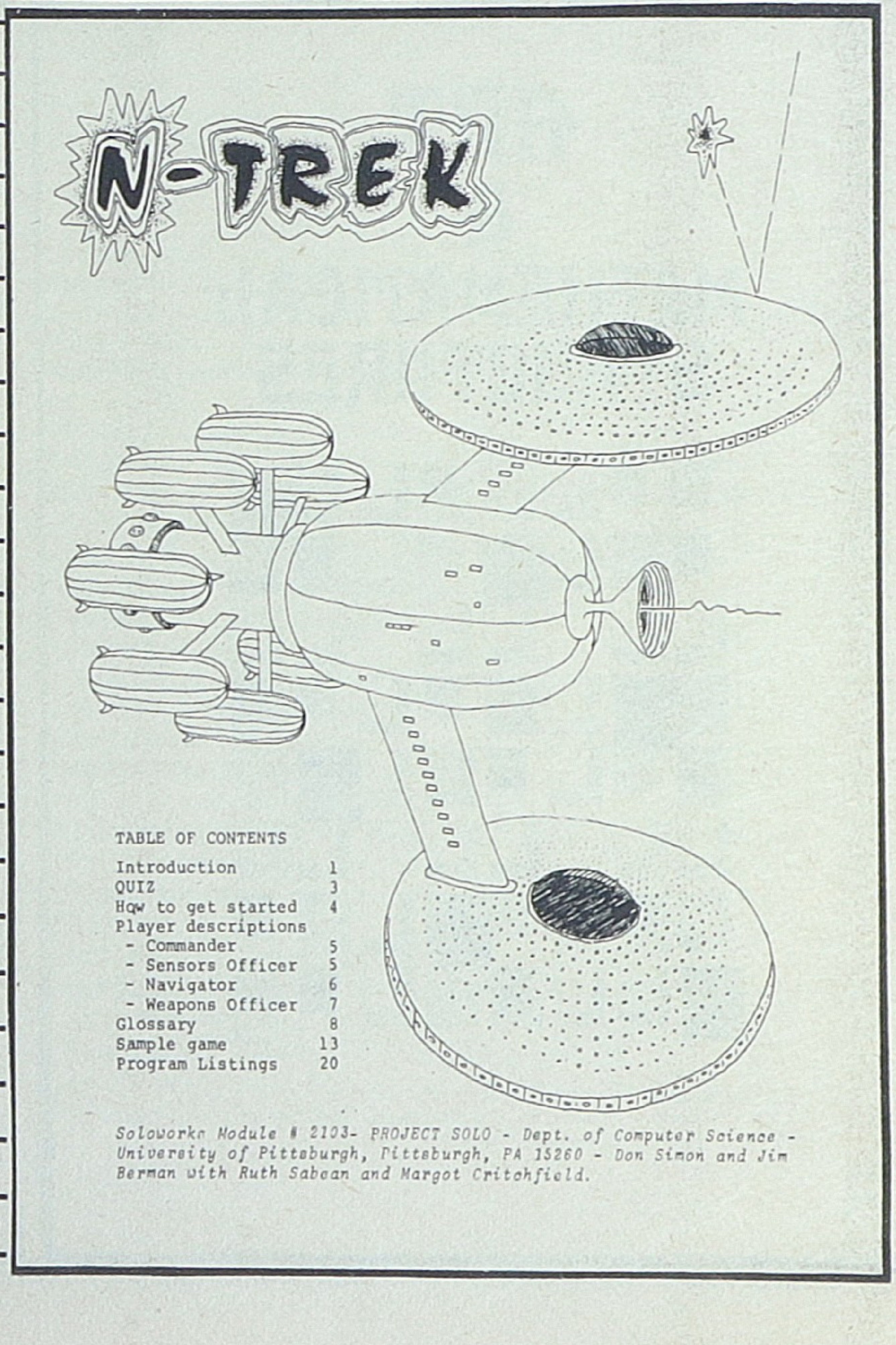

N-TREK

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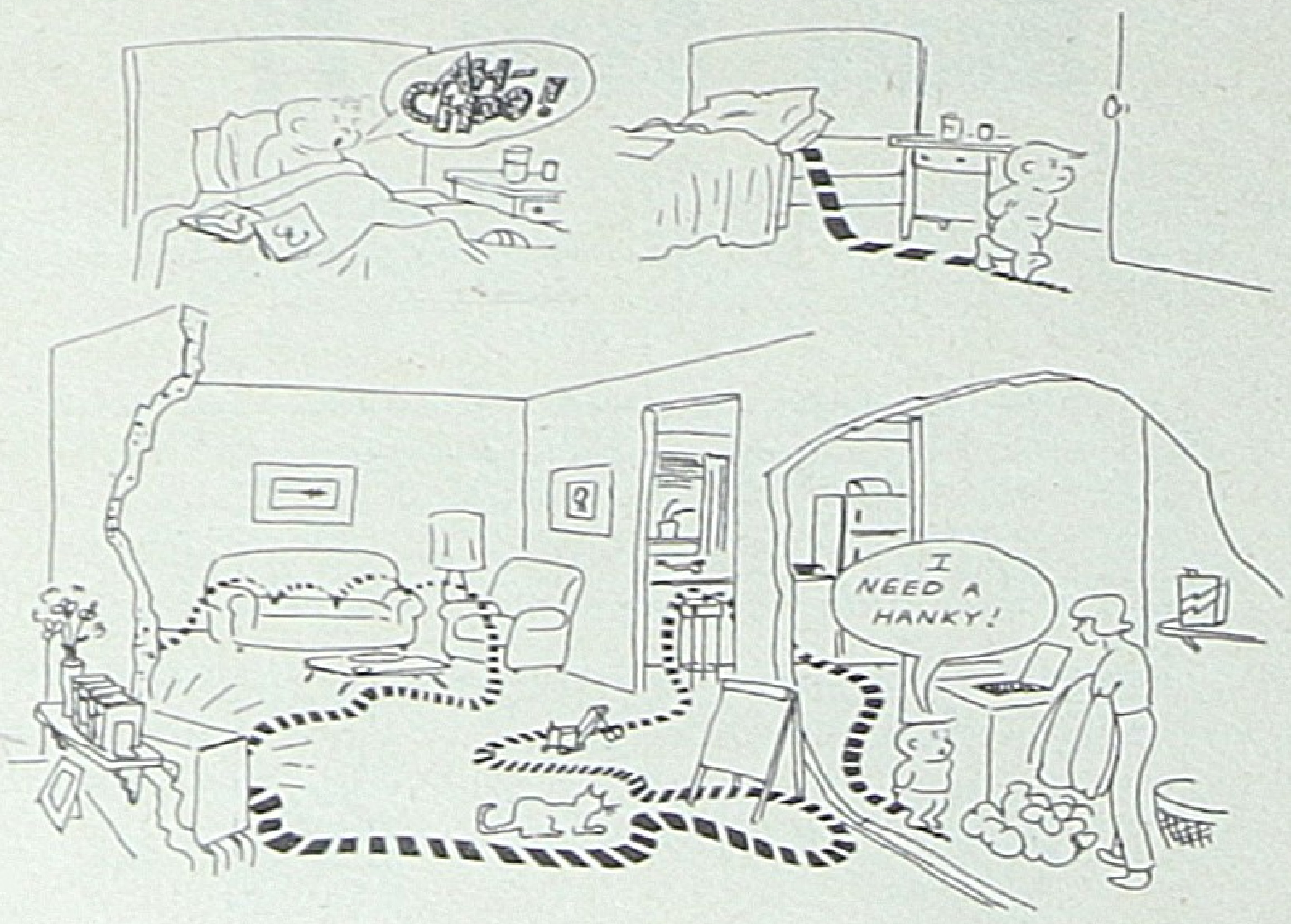
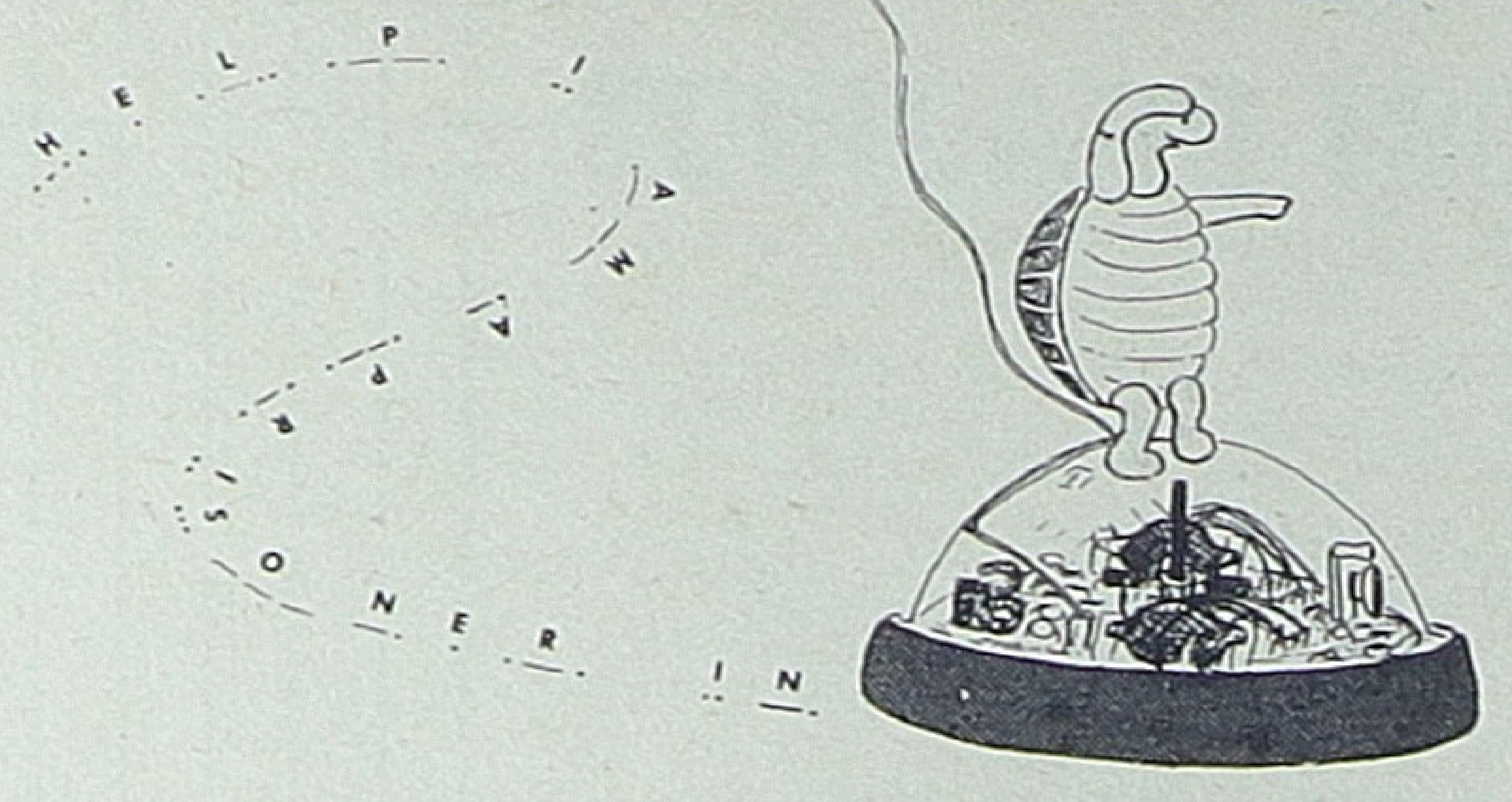
Soloworks Module # 2103- PROJECT SOLO - Dept. of Computer Science - University of Pittsburgh, Pittsburgh, PA 15260 - Don Simon and Jim Berman with Ruth Sabean and Margot Critchfield.


AH-CHOO!
I NEED A HANKY!

CRITICAL PATH ANALYSIS

Soloworks Module #2101 - PROJECT SOLO - Dept. of Computer Science University of Pittsburgh - Pgh. PA 15260 - Ruth M. Sabean with Margot Critchfield, Mary Burleigh, and Thomas Dwyer

THE TALKING TURTLE


H E L P ! I A M A P R I S O N E R ! N

COMING ATTRACTION

SEE THE MEETING OF THE TORTOISE AND THE HARE
WHEN THE SOLOWORKS GIANT ROBOT RABBIT
(WITH THE BIG BLUE EYES)
JOINS THE TURTLE IN A ROLLICKING DANCE
★ YOU'LL GASP ★ YOU'LL CRY ★ YOU'LL LAUGH ★
IT'S ALL IN MODULE # 4115
COMING SOON
TO YOUR NEIGHBORHOOD SOLOWORKS LAB

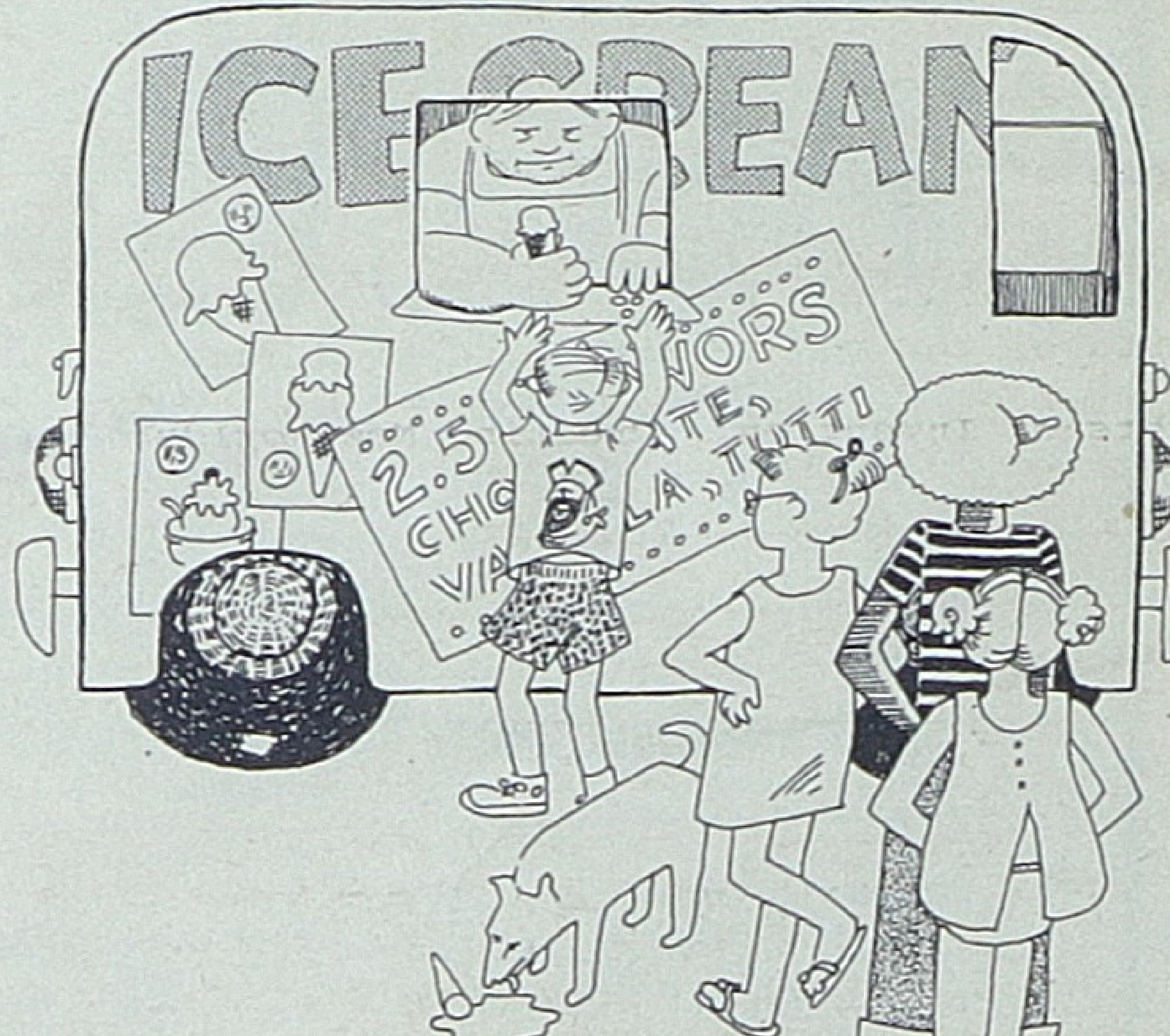
Soloworks Module #4110 - Project Solo - Dept. of Computer Science, University of Pittsburgh - Pgh. PA 15260 - Thomas Dwyer and Kathleen McIntyre-Seltman with Yale Cohen.

FRACTURED FRACTIONS

```
THIS PROGRAM CONVERTS DECIMALS TO FRACTIONS.

WHAT DECIMAL WOULD YOU LIKE CONVERTED?
? 3.14159265358
HOW MANY LEVELS (1 TO 12)?
? 12

 3  +  1
    ---------
      7  +  1
         ---------
           15  +  1
               ---------
                  1  +  1
                     ---------
                       292  +  1
                           ---------
                              1  +  1
                                 ---------
                                    1  +  1
                                       ---------
                                          1  +  1
                                             ---------
                                                1  +  1
                                                   ---------
                                                      1  +  1
                                                         ---------
                                                           12  +  1
                                                               -----
                                                                 1

       11359377
=  -------------  =   3.1415926536
        3615802
```

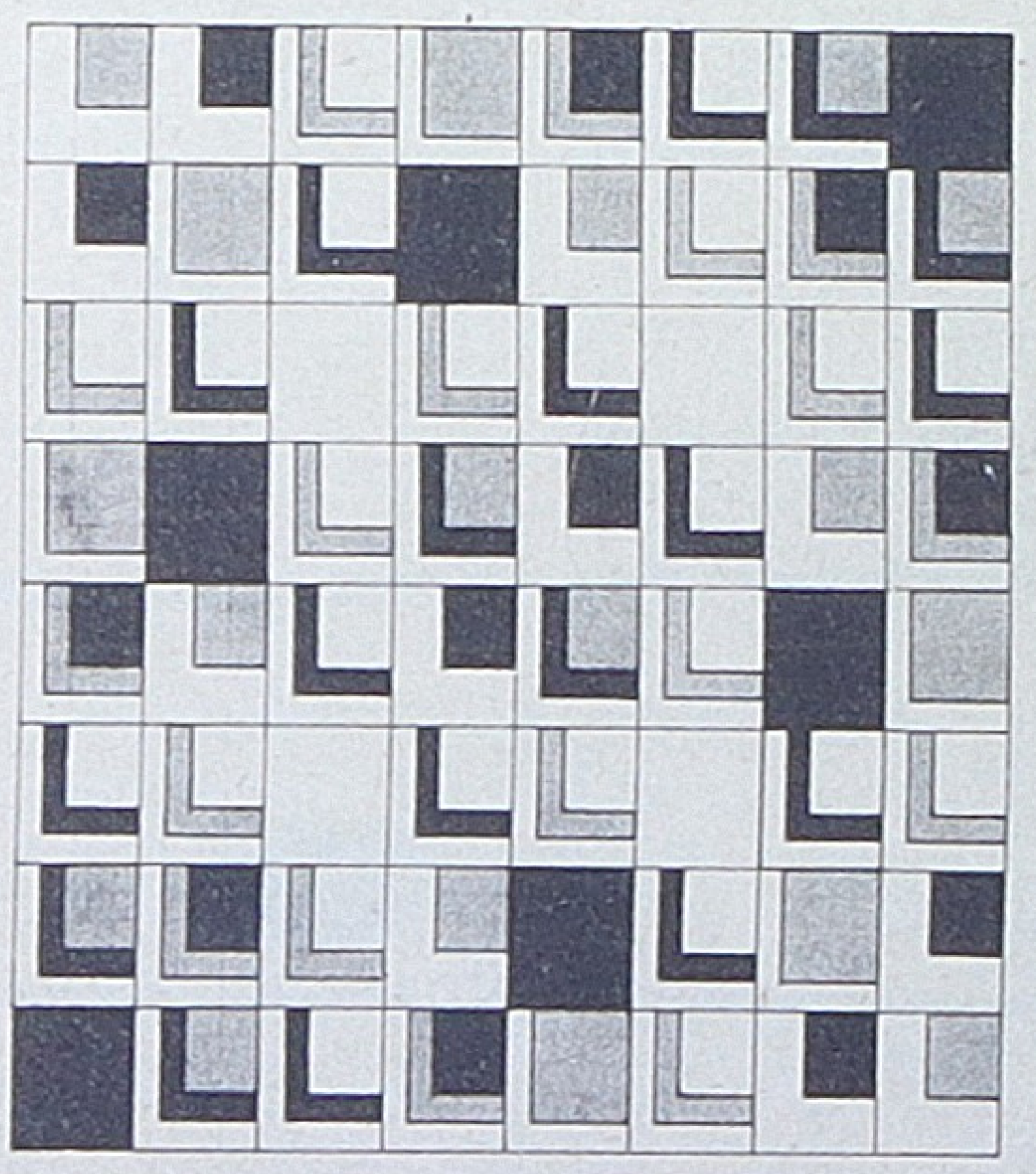
Soloworks Module #2105 - PROJECT SOLO - Dept. of Computer Science University of Pittsburgh, Pgh.,PA 15260 - Kathleen McIntyre-Seltman with Jon Simon

Single Server QUEUING SYSTEMS

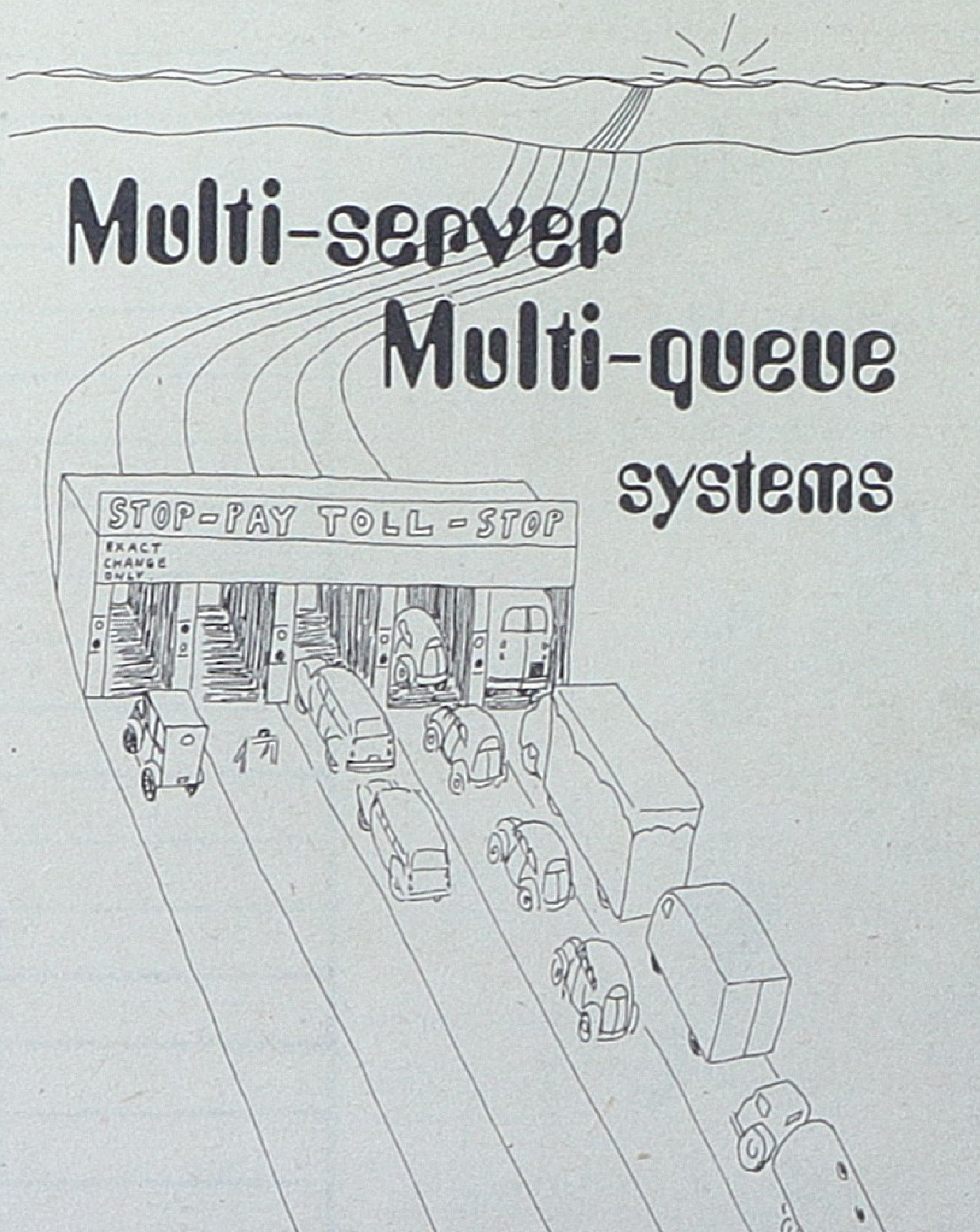


Soloworks
Module #2118
PROJECT SOLO
Dept. of Computer Science
University of Pittsburgh
Pittsburgh, PA 15260
Jeff Lederer with Thomas Dwyer
and Margot Critchfield

ART & MATHEMATICAL STRUCTURES



Soloworks Modules #2157,2158,2159,2160 - PROJECT SOLO - Dept. of Computer Science - University of Pittsburgh, Pgh., PA 15260 - Rochelle Chandhok, Margot Critchfield.



Multi-server Multi-queue systems

Soloworks Module #2124 - PROJECT SOLO - Dept. of Computer Science University of Pittsburgh, Pittsburgh, PA 15260 - Jeff Lederer

THE SOLOWORKS CURRICULUM STRUCTURE

THE PREP SERIES

A1 A Whirlwind Tour of Computer Programming
A2 Professional Secrets of Exact Arithmetic
A3 Computer Arithmetic; Absolute and Relative Error
A4 Professional Secrets of Approximate Arithmetic
A5 Beyond Arithmetic: A Soloworks Sampler

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C1 Computers, Algorithms, and Game Theory
C2 Computer Graphics
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EC9 Compilers and Interpreters
EC10 Systems Programming

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D4 On Solid Instruments: IFR Flight
D5 Moon Landing
ED6 Flights of Fancy: N-Trek
ED7 Flights into Space: Orbital Motion
ED8 Flights of the Mind: Mathematical Spaces
ED9 Flights of Invention: Creating New Worlds
ED10 The Theory of Relativity

THE SYNTHESIS LAB SERIES

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S3 Electronic Music: Synthesizers and Filters
S4 Stereo Systems: Design and Measurement
S5 Quadraphonic Sound; Coding and Decoding
ES6 Multi-Media Worlds; The Geometry of Projection
ES7 Abstract Orchestrations: Mathematical Approximation
ES8 Functions and Transformations
ES9 The De-Orchestration Problem: Statistical Analysis
ES10 Cryptography

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M1 Single Equation Models
M2 Logical Models; Truth Tables
M3 Systems of Equations; Relaxation Methods
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M5 Analog and Hybrid Models
M6 Dynamic Models: Systems of Differential Equations
EM7 Geometric Models; Crystallography
EM8 Finite State Models
EM9 Statistical Models
EM10 Adaptive Models; Optimization
EM11 Feedback Models; Cybernetics
EM12 Models of Intelligence
EM13 Multi-Mode Models
EM14 Interactive Models; Computer Animation

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Programming
Variables
Operators
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Error Analysis
Number Theory
Distributive & Associative laws
Spiral Curriculum
Algorithms
Coordinate Geometry
Polynomials
Linear & Quad Eq.
Linear Systems
Nonlinear Eq.
Iteration; Roots
Matrices
Order Relations
Post-Fix Arith.
Simulation
Recursion
Polar Coord.
Computer Literacy
Languages
Operating Systems
Distance
Metric Spaces
Integral Calculus
Kinematics
Vectors
Trigonometry
Anal. Geometry
Differential Calculus
Diff. Tables
File Structures
Kepler's Laws
Euclid
Descartes
Lobachevsky
Riemann
Einstein
Lebesgue, Hilbert
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Fractions
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Binary Codes
Harmonic Series
Fourier Series
Wave Geometry
Logarithms
Matrices
Information Theory
Geometric Optics
Fractions
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Green's Functions
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Relaxation Mthds.
Digital Design
Abstract Spaces
Perturbations
Coupled D.E.
Plane Geometry
Solid Geometry
Automata
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Statistics
Sociology
Linear Prog.
Gradient Mthds.
Complex Nos.
Maze Algorithms
Natural Language
Mathematics Applied to Non-deterministic systems

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A Guided Tour of BASIC;BASIC-PLUS Tutorials
Intense Addition;Intense Multiplication;Foreign Currency Conversion Prog.
*Grouping Tricks;Inverse Tricks;Metric Conversion
Supermarket Estimation;A Home Accounting System
How Wrong Is Wrong?;Multiple Precision Arithmetic
Fantastic Fractions;Rational Approximation
*Impossible Problems Made Possible
*Computer Lab Preview;Dynamics Lab Preview
*Synthesis Lab Preview;Modeling Lab Preview;Critical Path Analysis:I
NIM;Vector Race; Horse Race;Crazy Eights;Tennis;Star-Trek;
Submarine;Baseball;Basketball;Football;*Swimming;Bowling
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Horner's Algorithm;*Budget CRT Graphics;*The Megatek System
Linear Systems;Gauss 2;Gauss 3;Gauss N;Quadratic Solver;
Quadratic Coding;GCD;Primes;The Big Ear:Computer Design of Paraboloids
Root-Finding;Binary Search;Convergence Tests;*Secant Method
Synthetic Division;Newton's Method;Dwyer's Method;Finding Derivatives
Picture Arrays;Parametric Equations
Sorting Tricks;Lissajous Figures;Polar Plots
Enumeration Problems;Reverse English;Polish Notation
*Mobiles;Circular Queues;33 Flavors
Factorials;GCD Revisited Recursively
*Turtle Geometry;Critical Path Analysis:II
Simulating A Computer;Machine Language
Minicomp III;Computer Generated English,Russian,Greek Alphabets
How to Write a Compiler
How to Write an Interpretor
Mailbag;System Accounting;A File Formating System
Interactive Editors;Report Generators;Computer Generated Ditto Masters
*From Euclid to Newton to Einstein
Bounce Animation;Basketball Trajectory;Evel Knievel
Mechanical Integrators;Analog Integrators
*Digital Integrators;3 A/D, D/A Lab Projects
Principles of Flight
How to Fly an Airplane
*How to Navigate an Airplane
*Instrument Landing Systems
1-D Lunar;*Difference Equations
2-D Lunar;*Fancy Lunar
Star-Trek;Space Ship Gamma
N-Trek
Satellite Orbits
Space War
*Euclidean Space;Vector Spaces
*Finite Abstract Spaces
*Infinite Abstract Spaces
*Function Spaces: Functional Analysis
Computer Representation of Synchronized Events
A Music Compiler,Editor, and File System
Computer Composition of Music;Rounds and Harmony
How to Build an Orchestra-to-Computer Interface
*How to Build Computer Controlled Instruments
*The Natural Richness of Natural Music
Synthetic Music and the Formant Theory
*The Secrets of Professional Stereo
*Fine Tuning Your Stereo: The Power of Measurement
*Four into Two: Matrix Coding
*Two into Four: Matrix Decoding
Computer Control of Multi-Media Technology
*Lenses, Mirrors, and Pictures Made of Light; *Laser
Continued Fractions;Polynomial Interpolation
Mini-Max Approximations;Famous Infinite Series
*Relations and Functions
*Mappings and Transformations
*Predicting Football Scores, Elections,And Other Logic-Defying Events
Enciphering with the One Time Pad
*The Deciphering Problem
Linear and Nonlinear Predictors
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Digital Logic; 3 Lab Exercises in Digital Interfacing
*Macro-Micro Logic
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Random Walk Models
Communication Networks
PDE&Nonlinear-Networks; Relaxation Methods
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An Interactive Nonlinear-Network Model
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COLA INSIGHT

COLA INSIGHT is the new publication of THE COMPUTER ORGANIZATION OF LOS ANGELES, an educational user's group for people interested in computer applications in the classroom. For info, write to: COLA, P. O. Box 43677, Los Angeles, Ca. 90043.

SHARING — THE DTSS NEWSLETTER

Monthly newsletter of the Dartmouth Time-Sharing System, the home of BASIC. Monthly, four pages. Vol. 1, No. 1 (November 1975) has information on TM086, *Publications List*, a catalog of publications by the Kiewit Computation Center at Dartmouth College. They can probably tell you how to get a Dartmouth BASIC reference manual so you can learn to read the listings of MOTIE and RESCUE in this issue of PCC. For info: DTSS, Inc., Box 799, Hanover, NH 03755.

ALPHA BRAIN WAVES

ALPHA BRAIN WAVES. by Jodi Lawrence. $1.25, paper. Avon Books, New York 1972.

Easy to read, non-technical introduction to brainwave (EEG) research and biofeedback.

NEW MIND. NEW BODY.

NEW MIND. NEW BODY. by Barbara Brown. $9.95, hard cover. Harper and Rowe, New York, 1974.

The *Compleat* introduction to biofeedback, from skin talk to brain waves. Heavy reading, but an incredible reservoir of information.

BLACK TIMES

BLACK TIMES: Voices of the National Community provides a celebration of Black America for all, aimed at creating awareness of developments in the Black Community, including: individual and group efforts and achievements in the community, national and international news bearing on Black America, letters from prisoners, Black history, book reviews, short stories, poetry. Subscriptions are $10 per year, with reduced rates for students, prisoners, and enlisted people. Those wishing to use BLACK TIMES, and/or subscribe, please write: BLACK TIMES, Box 1579, Palo Alto, California 94302.

COMPCON 76

IEEE Computer Society International Conference, Jack Tar Hotel, San Francisco, Ca., Feb. 24, 25, 26. We'll be there — Thursday, Feb. 26, doing the session:

The Personal Computer: Dream or Reality?
"The Hobby Computer" Hal Singer
"The Home Computer" Keith Britton

For more info, write:
Jon E. Peterson
COMPCON 76 SPRING
IBM Corp. R62/123
5600 Cottle Road
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BRAIN/MIND BULLETIN

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From: ELECTRONOTES, 203 Snyder Hill Road,
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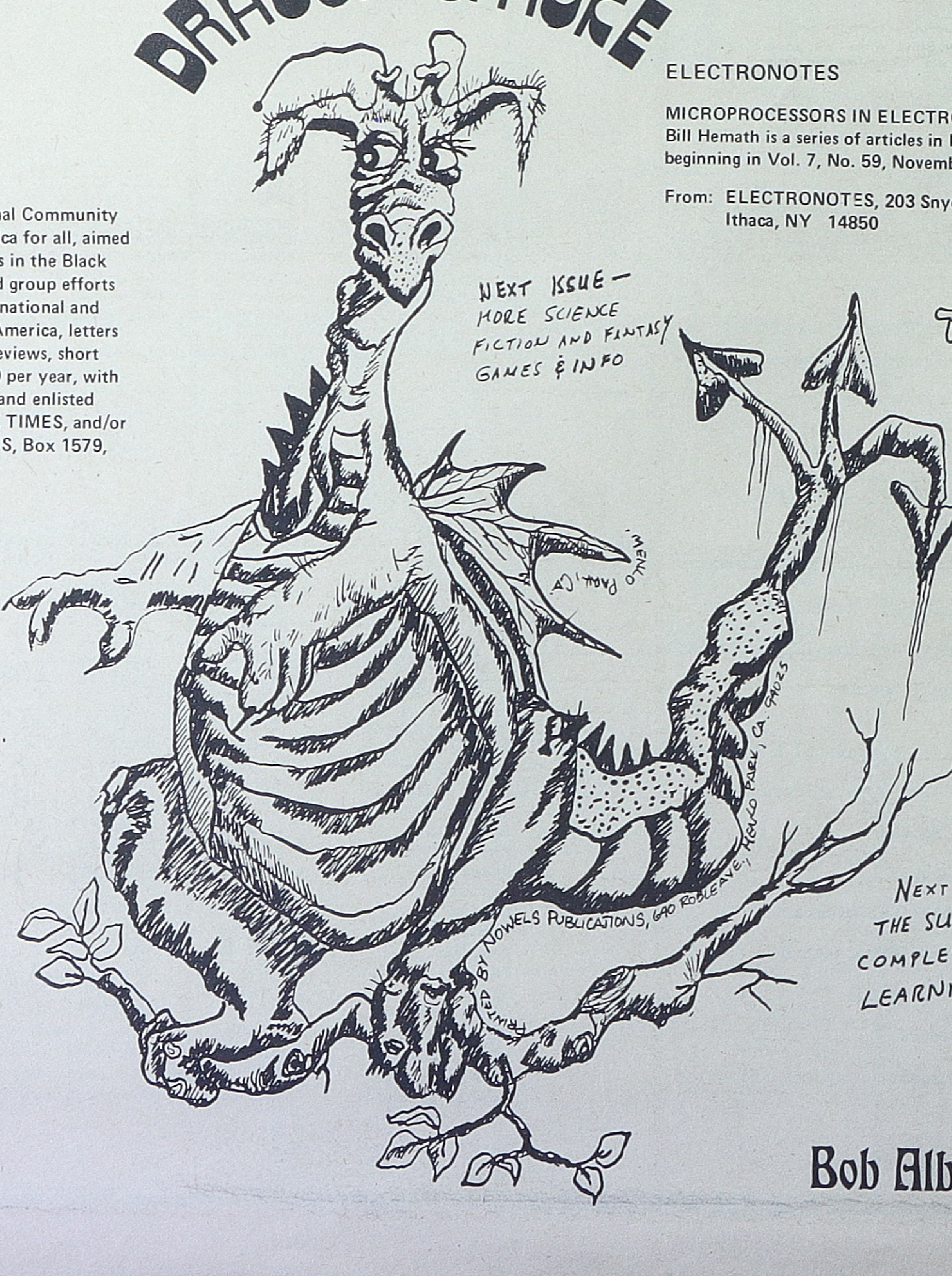
DRAGON SMOKE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NEXT ISSUE — MORE SCIENCE FICTION AND FANTASY GAMES & INFO

TINY BASIC

NEWSLETTER • • • WE WILL GET FIRST ISSUE IN THE MAIL LATE JANUARY & INCLUDES DESCRIPTION & OCTAL CODE FOR EXTENDED TINY BASIC BY DICK WHIPPLE & JOHN ARNOLD

SEND A COMPUTER GAME TO THE PCC DRAGON... IF WE PUBLISH YOUR GAME, WE WILL SEND YOU A FREE COPY OF WHAT TO DO AFTER YOU HIT RETURN, PCC's BIG BOOK OF COMPUTER GAMES.

NEXT ISSUE THE SUPER-ECSTATIC, COMPLETELY-CREDIBLE LEARNING FAIRE!

Bob Albrecht

FORTRAN MAN
Lee Schneider
Todd Voros
Hmmmmm . . . If I guess it right, I think I know where those bootleg files are going to — I'd better question Big Mho right now!
Careful, F-Man! He could give you a series resistance!
Don't worry about me Billy, . . . you stay here and watch, and I'll go inside and see if I can get any information out of Big Mho!
BIG AL'S New & Used Kilocycles
Gee, F-Man! I always miss all the fun !
While Billy Basic waits outside, Fortran Man changes his sign bit and branches into 999. As he suspected, Big Mho himself is tending the bar! Shoving his way through the crowd, he makes his way to the bar, and attracts Mho's attention . . .
Hey, Gimme a can of Bitz! And make it fast!
All right, already! Ya think I can't hear?
As Big Mho arrives with the can of Bitz, F-Man flashes a signal known only to certain groups of underground characters (an ESC char.), which identifies him as a fellow criminal . . .
Say, Mho . . . I heard about a big file shipment coming in . . . the Big C sent for me to help get it through in time . . . you know where I can find him?
Funny, he didn't mention anybody else to me . . . you sure you got your info right?
How should I know? Why don't we go see him and find out?
Big Mho, an experienced criminal, does not spill information easily . . . and soon becomes suspicious of all the questions . . .
Well, how about it? Do we go see the Big C or not?
Look mac, why don't you just . . .
Hey! Don't I know you from somewhere else . . . ???
Seeing that the trick will not work, and that Big Mho is becoming suspicious about him, F-Man quickly switches tactics . . . reaching over the bar, he grabs Big Mho, and . . .
All right, Mho! The time for funny answers is over! You tell me what I want to know, and fast!
Hey! Hands off, you bum! Who do you think you are anyway?
Big Mho breaks away, as Fortran Man suddenly drops his disguise . . .
THIS is who I am, Mho . . . and I'm taking you in!
GASP!
Let's get out of here
!
But Big Mho, who is not frightened easily, suddenly pulls a one-shot multivibrator from beneath the bar, and fires a barrage of one microsecond pulses through the room!
You'll never get me alive!!
zap zap zap zap
Ping!
Using the momentary surprise, Big Mho leaps over the bar, runs out of the room and into the street outside — with Fortran Man in hot pursuit!
Lucky my response time is better than one microsecond . . . or I'd be a goner by now!
Out in the street, F-Man finds Billy Basic, who is just picking himself up off of the ground . . .
Which way did he go Billy?
He ran across the street to Big Al's lot and did a Cycle Steal, F-Man! He was heading for the south side of town, you'll never catch him!
But Fortran Man only smiles, and helps Billy to recover his potential . . . .
Don't worry, Billy! When I was pretending to pick a fight with Mho a few minutes ago, I was actually slipping a miniaturized Trace Routine into his pocket! He is sure to head straight for the hidout of Cornelius Cobol and I can follow him right from here!
As he and Billy head for the lot, to pick out a kilocycle for themselves, F-Man shows him a new device . . .
See this? It's a miniature data switch register! I can activate the trace routine right from here, and find its position by observing the display here!
Climbing aboard their Kilocycle, F-Man gives the tracing device to Billy, triggers the cycle into operation, and the chase begins!
I'd better do the driving, Billy! You don't know your way around 360 City like I do.
Just a moment . . .
Where is he?
Aha! He's heading for the I/O control register!
Just as I suspected! He's going to get out of the town of Buffer and try to lose us in the processor!
Hang on!
As they speed over the famous Wheatstone Bridge which isolates the lower end of Buffer from the main processor, Billy Basic keeps one pointer glued to the trace monitor
He's out of Buffer, and heading for the accumulator section.
He'll try to lose us by transferring around the registers!
Bufr
Acc
They are forced to slow down as they approach the Acc control center, one of the busiest sections of 360 City . . .
store!
load
compl
add!
xfr!
Keep going, F-Man! He's in there somewhere!
Patience, Billy! We must respect the rights of these other bits!
1011
0010
1001
1110
0010
1000
10110100
110010100101
Fighting free of the great volumes of traffic, Fortran Man takes a short-cut . . . .
Hang on tight, Billy! I'm going to do a High-speed transfer through all the registers!
I don't think that . . . urk!
F-Man swiftly examines each register in stack .
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
BUMP!
BUMP!
BAM!
THUD!
BAM!
BUMP!
BAM!
BUMP!
BUMP!
He's not here! He must have shifted out at one of the other levels!
Whew! What a ride!
Although shaken up by the ride, Billy Basic still keeps watch on the trace position indicator . . . .
He's heading for low core . . .
DIAGNOSTICS SECTION Emergencies — Use rear entrance
Good!
Billy is somewhat mystified by F-Man's apparent unconcern that their quarry is escaping . . . . . .
Why good?
Because, Billy, in 360 City low-core is protected! If Big Mho goes in there, he won't be able to get in! And that leaves him only one excape, and that is . . . .
Speed Limit 55 Kc
You're right, F-Man! He's headed for the power supplies!
And that means he's going under ground! He'll lead us right to Cornelius Cobol!
TO BE CONTINUED . . . .

DIDDLE for a small Altair 8800

by Stan Skoglund

I have put together a little program by trial and error which I believe is unique. Having limited memory and I/O capabilities, I was forced to listen to "Daisy" or come up with something new. Armed with the basic desire to develop something usable on my Altair, I set out to explore the software world of creativity. The following is the end product. I hope you get as much enjoyment from using DIDDLE as I have from developing it.

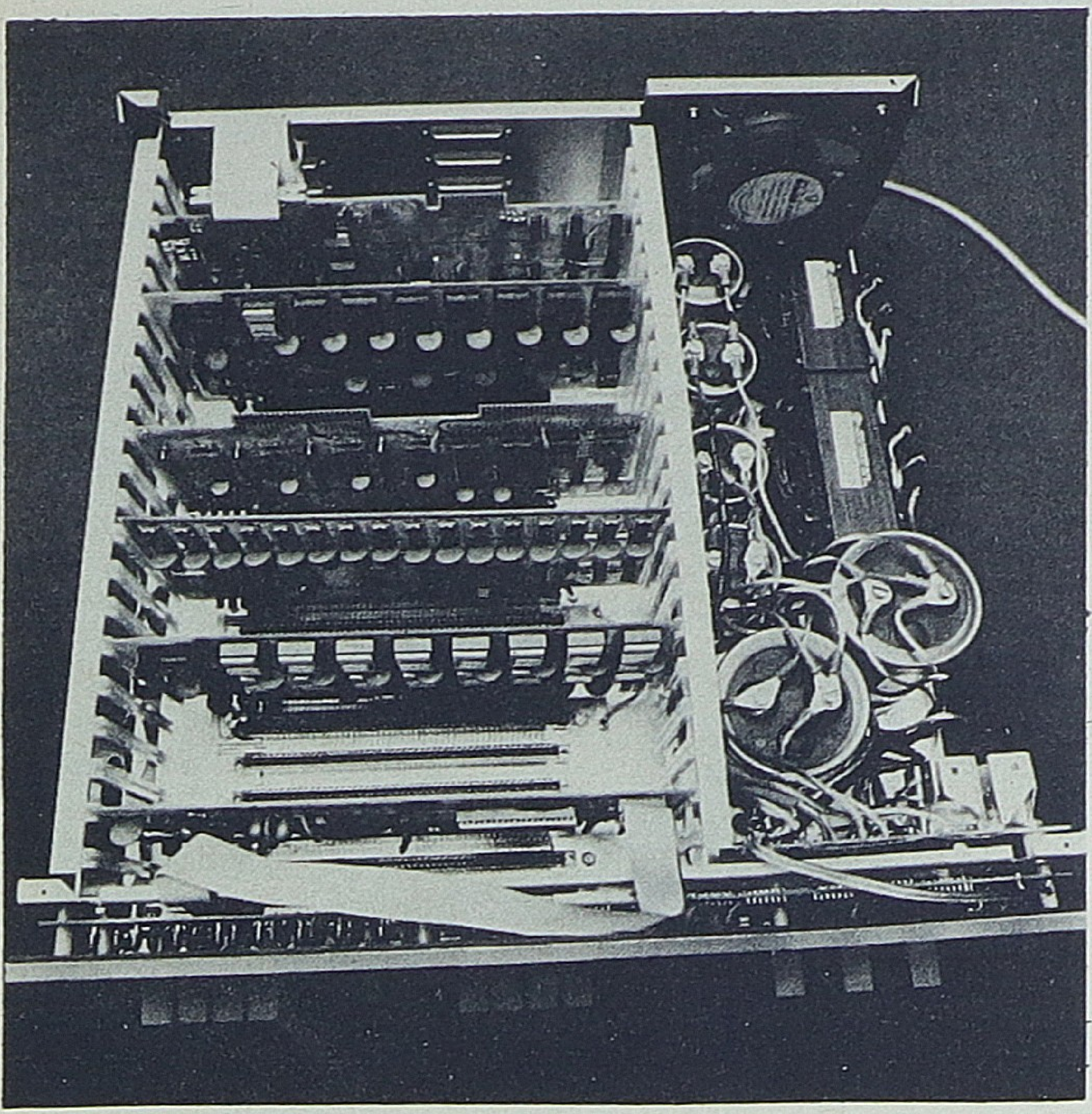
DIDDLE was first published in *Personal Systems* Volume 1, Issue 2, October 24, 1975. *Personal Systems* is a publication of the San Diego Computing Society, For information: Personal Systems, 10137 Caminito Jovial, San Diego, Ca. 92126.

```
;
;
;             "DIDDLE"
;             ========
;
;
;     "DIDDLE" IS A GAME PROGRAM IN WHICH ONE CAN SIT WITH AN ALTAIR
;     8800 COMPUTER AND DIDDLE AROUND FOR SOME TIME WITHOUT SOLVING
;     ANYTHING.  THE PURE SATISFATION OF BEATING THE GAME MAKES IT
;     ALL WORTHWHILE.
;
;
;     THE OBJECT OF "DIDDLE" IS TO STOP THE MOVING PATTERN IN ADDRESS
;     LIGHTS A12 AND A13 WHILE IT IS APPROACHING FROM THE RIGHT.
;     IF THIS IS DONE WITHIN THE RULES AND REGULATION YOU ARE
;     CONSIDERED A WINNER.  OF COURSE MOST EVERYBODY WINS AT THE
;     SLOWER SPEEDS WHILE ONLY A SELECTED FEW ARE TALENTED ENOUGH TO
;     BEAT THE COMPUTER IN THE HIGH SPEED RACE.  TRY YOUR LUCK!
;
;
;     LOAD "DIDDLE" VIA THE FRONT PANEL SWITCHES REFERING TO THE
;     LISTING BELOW.  FOR THOSE OF YOU WISHING TO MAKE PAPER TAPES
;     AND/OR XEROX COPIES OF THIS LISTING, BE MY GUEST.  DIDDLE IS
;     PUBLIC DOMAIN SOFTWARE.
;
;
;     PROGRAM OPERATION IS AS FOLLOWS:
;
;             1. SELECT THE PROGRAM STARTING ADDRESS BY SETTING ALL
;                THE ADDRESS SWITCHES OFF(DOWN).
;
;             2. PRESS EXAMINE.
;
;             3. PRESS RUN.
;
;             4. SET ADDRESS SWITCH 10 UP.  OBSERVE A PATTERN MOVING
;                IN ADDRESS LIGHTS A08 THUR A15.  WATCH IT FOR A MINUTE
;                OR SO.  TRY TO PREDICT ITS BEHAVIOR.
;
;             5. SET ALL THE ADDRESS SWITCHES DOWN.  NOTE THAT THE
;                PATTERN STOPS MOVING.  NOW SET ADDRESS SWITCH 10 UP
;                AGAIN.  THE DISPLAY IN THE LIGHTS SHOULD START
;                MOVING AGAIN IF THE PROGRAM IS OPERATING PROPERLY.
;
;             6. THERE EXISTS A RELATIONSHIP BETWEEN THE SPEED OF THE
;                MOVING PATTERN AND THE ADDRESS SWITCH USED IN STEPS
;                4 AND 5.  SWITCHES TO THE LEFT OF A10 WILL CAUSE THE
;                PATTERN TO MOVE FASTER WHILE SWITCHES TO THE RIGHT
;                WILL PRODUCE A SLOWER MOTION.  ONLY A08 THUR A15 CAN
;                BE USED.  PROGRAM IGNORES SWITCHES A00 THUR A07.
;
;
      EJEC
;
;
;     RULES AND REGULATION:
;
;             1. ONCE A PLAYER STARTS THE PATTERN MOVING, HE MUST
;                WAIT AT LEAST 5 SECONDS BEFORE MAKING HIS MOVE TO
;                STOP IT.  THIS PREVENTS A PLAYER FROM CREEPING UP
;                TO THE STOPPING SPOT BY TOGGLING THE SPEED SWITCH.
;
;             2. THE MOVING PATTERN MUST BE APPROACHING THE STOPPING
;                POSITION FROM THE RIGHT WHEN A PLAYER ATTEMPTS HIS
;                MOVE.
;
;             3. YOU MUST UPON DEMAND SHOW THAT YOU CAN BEAT "DIDDLE"
;                3 OUT OF 3 TIMES AT THE SPEED YOU CLAIM TO BE A
;                WINNER.  IF YOU CAN NOT DO THIS, THEN YOU ARE NOT A
;                BONA FIDE WINNER, BUT JUST A DIDDLER.
;
;             4. IN ALL CASES THE BURDEN OF PROOF IS LEFT TO THE
;                PLAYER, NOT THE JUDGES.  ALSO, THE JUDGES DECISION
;                IS FINAL.
;
;
;
;*****************************************************************
;                                                                *
;                          C-A-U-T-I-O-N                         *
;        DIDDLE MAY BE HAZARDOUS TO YOUR ADDRESS SWITCHES        *
;                                                                *
;*****************************************************************
;
;
;
;     PROGRAMMER: STAN SKOGLUND
;                 1111 HORNBLEND STREET, APT. 19
;                 SAN DIEGO, CALIFORNIA 92109
;                 HOME PHONE: (714) 272-1660
;
;     DATE OF RELEASE: 10/18/75
;
      EJEC
```

```
                      OCTAL
                ;
                ;
000377          SWTCH: EQU     255          ;ADDRESS OF SENSE SWITCH PORT
                ;
000000                 ORG     000000
                ;
                ;      "DIDDLE"  VERSION 1.0
                ;
000000  076     START: MVI     A,3          ;INITIALIZE DISPLAY PATTERN
000001  003
000002  016     BEGIN: MVI     C,0          ;INITIALIZE DIRECTION COUNTER
000003  000
000004  107     RUN:   MOV     B,A          ;MOVE DISPLAY TO B-REG
000005  021     SPEED: LXI     D,64         ;INITIALIZE TIMER DURATION COUNTER
000006  100
000007  000
000010  041            LXI     H,0          ;INITIALIZE TIMER BASE
000011  000
000012  000
000013  002     DSPLY: STAX    B            ;DISPLAY BIT PATTERN VIA ADDRESS LIGHTS
000014  002            STAX    B            ;DO IT AGAIN TO MAKE IT BRIGHTER
000015  002            STAX    B            ;AND BRIGHTER....
000016  002            STAX    B            ;AND BRIGHTER....
000017  002            STAX    B            ;AND BRIGHTER....
000020  002            STAX    B            ;AND BRIGHTER....
000021  002            STAX    B            ;AND BRIGHTEST!
000022  031            DAD     D            ;ADD TO TIMER BASE.  TIMER ELASPED?
000023  322            JNC     DSPLY        ;NO, GO BACK AND DISPLAY AGAIN
000024  013
000025  000
000026  333            IN      SWTCH        ;OTHERWISE READ SENSE SWITCHES
000027  377
000030  376            CPI     0            ;DOES PLAYER WANT DISPLAY TO STOP?
000031  000
000032  312            JZ      SPEED        ;YES, GO BACK AND RE-ISSUE SAME DISPLAY
000033  005
000034  000
000035  062            STA     SPEED+1      ;OTHERWISE SAVE NEW SPEED
000036  006
000037  000
000040  014            INR     C            ;BUMP DIRECTION COUNTER
000041  171            MOV     A,C
000042  376            CPI     63           ;TIME TO RESET DIRECTION COUNTER?
000043  077
000044  362            JP      RESET        ;YES, JUMP TO RESET SECTION
000045  063
000046  000
000047  376            CPI     31           ;SET STATUS WORD
000050  037
000051  170            MOV     A,B          ;MOVE PATTERN INTO A-REG.
000052  007            RLC                  ;SHIFT PATTERN 1 BIT TO THE LEFT
000053  372            JM      RUN          ;JUMP IF STILL MOVING IN LEFT DIRECTION
000054  004
000055  000
                       EJEC

000056  017            RRC                  ;SHIFT PATTERN 1 BIT TO THE RIGHT
000057  017            RRC                  ;SHIFT PATTERN 1 BIT TO THE RIGHT
000060  303            JMP     RUN          ;GO DISPLAY NEW PATTERN AT NEW SPEED
000061  004
000062  000
                ;
                ;
                ;
                ;
                ;      THIS SECTION IS EXECUTED AFTER PATTERN HAS MOVED 4 TIMES TO
                ;      LEFT AND 4 TIMES TO THE RIGHT.
                ;
000063  170     RESET: MOV     A,B          ;MOVE PATTERN INTO A-REG.
                ;
                ;      THIS NEXT LOCATION CAN BE LOADED WITH OCTAL 057 WHICH WILL
                ;      ADD A LITTLE ZIP TO DIDDLE.
                ;
000064  000            NOP                  ;CHANGE TO CMA
000065  303            JMP     BEGIN        ;GO START OVER AGAIN
000066  002
000067  000
                       END
                  0  ERRORS
```

IMSAI



PROGRESS REPORT

The IMSAI prototype which was shown round the Bay area hobby clubs looked so good that we have been holding our fingers crossed for a month lest it prove too good to be true. Well - the inside story is now exposed to public gaze - and it's just beautifull!

It's perhaps not surprising. IMS Associates Inc. have been working on digital devices for 4 years, the first 2½ of which were expensive contract jobs involving 'state of the art' design or original research. Since then they have also been working on their own products, an intelligent disk drive and their famous 'Hypercube'. The latter is the most advanced multiple processor project in the world. It uses lots of 8080s in cooperative arrays. Quite obviously their background is much different from that of MITS. They started design of their machine much later, too. It isn't surprising that the IMSAI looks so much a professional piece of equipment, therefore, as well as being a hobbyist's dream and at Altair price levels too. But let us return to a consideration of the guts of the machine.

The first impression upon opening the case is the absence of wires and the presence of the power supply. Cards, mother board and front panel all plug together and there is not a jumper to be seen (shouldn't be with good PC board design), which accounts for the former. The only connections which have to be flexible are tidy flat cable, which also reduces the chance of cross-talk. The power supply is intended to be adequate for most users and would not look out of place in a small welding shop. Minimum machines use a single set up, the one shown is the double one for the full machine. Note the massive smoothing capacitors and generous heat sinks on the diodes (mounted on the front panel). Thermal design for the machine is fair, the card supports are ventilated, allowing airflow across the cards and out via the power supply space. And the fan, believe it or not, is all but silent!

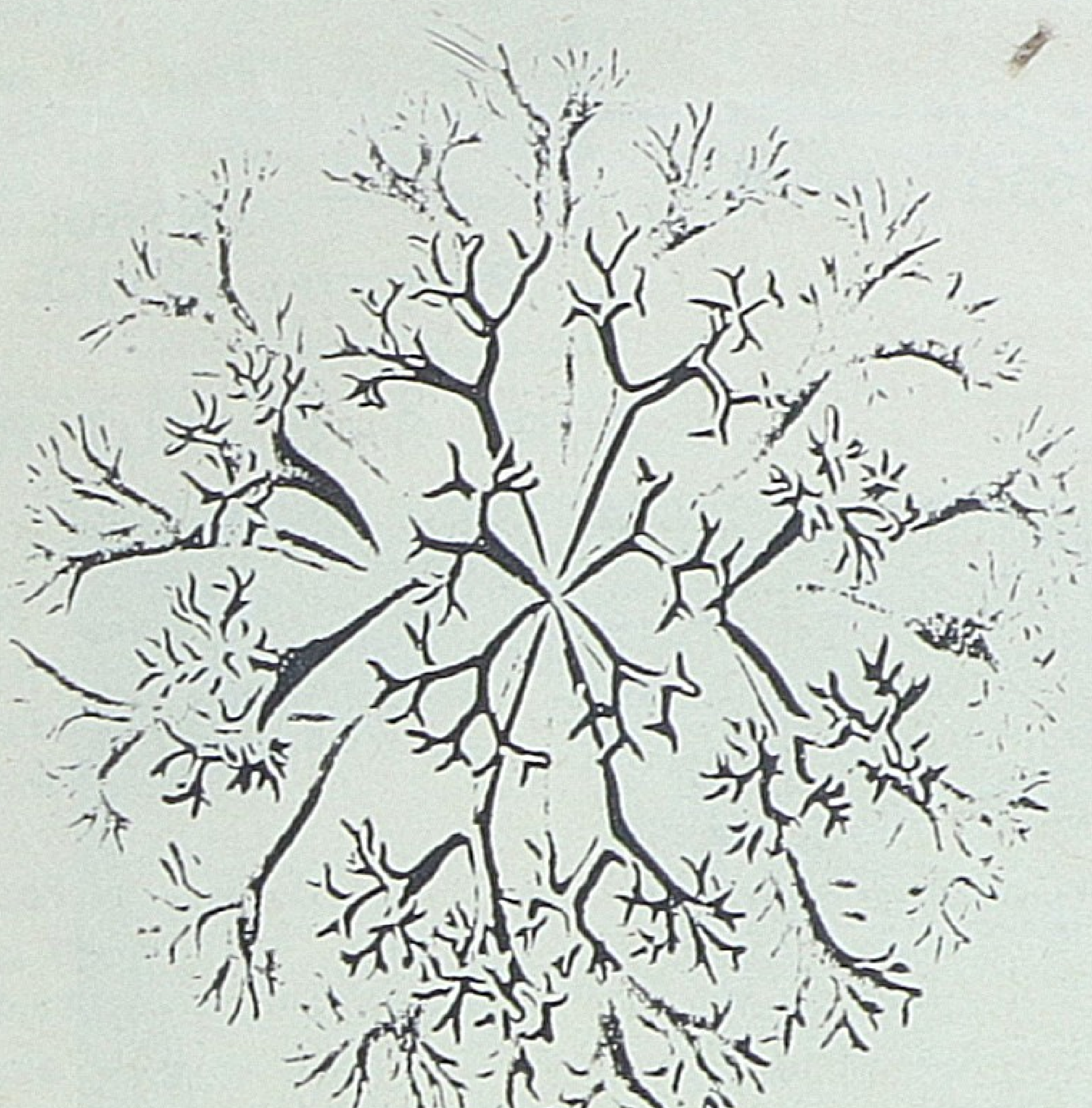
The cards, as in all professional equipment are caged, supported on their edges. The cards themselves are liberally decoupled, as is evident from the number of disk capacitors, so it looks unlikely that noise will be a problem. There is no bus termination though. We asked about that and were told that they had had no problem and did not expect any. Since they are used to designing things which run more than ten times faster, we take their word on this.

As with all complex machines, there can be expected to be teething troubles, but the overall quality and design experience evident suggest that they will be minor. *This, in fact, is the first major kit computer that we have been able to closely examine that we can recommend for serious consideration for a school which does not have an experienced and well equipped technician to maintain it.*

HOW MANY PINCHES IN A POUND AND OTHER PUZZLES? MAC MULLEN

One of the ever present problems in almost any kitchen is adjusting favorite recipes to fit into a menu to feed many or few. Most experienced cooks use a combination of basic arithmetic and intuition to come up with proper proportions. However, if you face the job of turning "Mom's Meatloaf" into dinner for 26, you could try programming your handy home computer to solve such domestic problems. Remember, that some things like eggs come in whole units and are difficult to divide into thirds, and in some dishes, the amount of baking powder isn't directly proportional to the increase in the serving size. Perhaps the most difficult problems to solve today is to keep you meals within a reasonable budget.

Here is a small problem to puzzle the cook who likes to solve math problems .



WALDORF SALAD PUZZLE

You have invited guests for dinner. Everything is ready except for your "Famous" Waldorf Salad. You need celery, apples and nuts. You go to the store to buy exactly 100 of these items, and you must spend exactly $10.00 for you salad. At the store you find celery is 50¢ a bunch, apples 10¢ each and nut meats cost 2¢ for a cellophane bag. *How many of each item must you buy to fit within the constraints of this puzzle?* Remember, the salad has to have some of all three items, you must spend exactly $10.00 (no sales tax) and you already have the mayo.

THREE PROGRAMMED SOLUTIONS IN ALTAIR BASIC

1

```
100 REM SIMPLE SOLUTION - SEARCH ALL COMBINATIONS
110 FOR C=1 TO 98
120 FOR A=1 TO 98
130 FOR N=1 TO 98
140 IF C+A+N <> 100 THEN 160
150 IF 50*C+10*A+2*N = 1000 THEN PRINT C,A,N
160 NEXT N
170 NEXT A
180 NEXT C                                A - APPLE
999 END                                   C - CELERY
                                          N - NUTS
```

2

```
100 REM   IMPROVED SOLUTION - SEARCH FIRST
110 REM   TWO CONSTRAINED VARIABLES AND
120 REM   SEE IF THE REMAINING COUNT WILL FIT.
130 FOR C=1 TO 19
140 FOR A=1 TO 94
150 IF A+C > 99 THEN 190
160 LET N=100-A-C
170 IF 10*A+50*C+2*N = 1000 THEN PRINT C,A,N
180 NEXT A
190 NEXT C
999 END
```

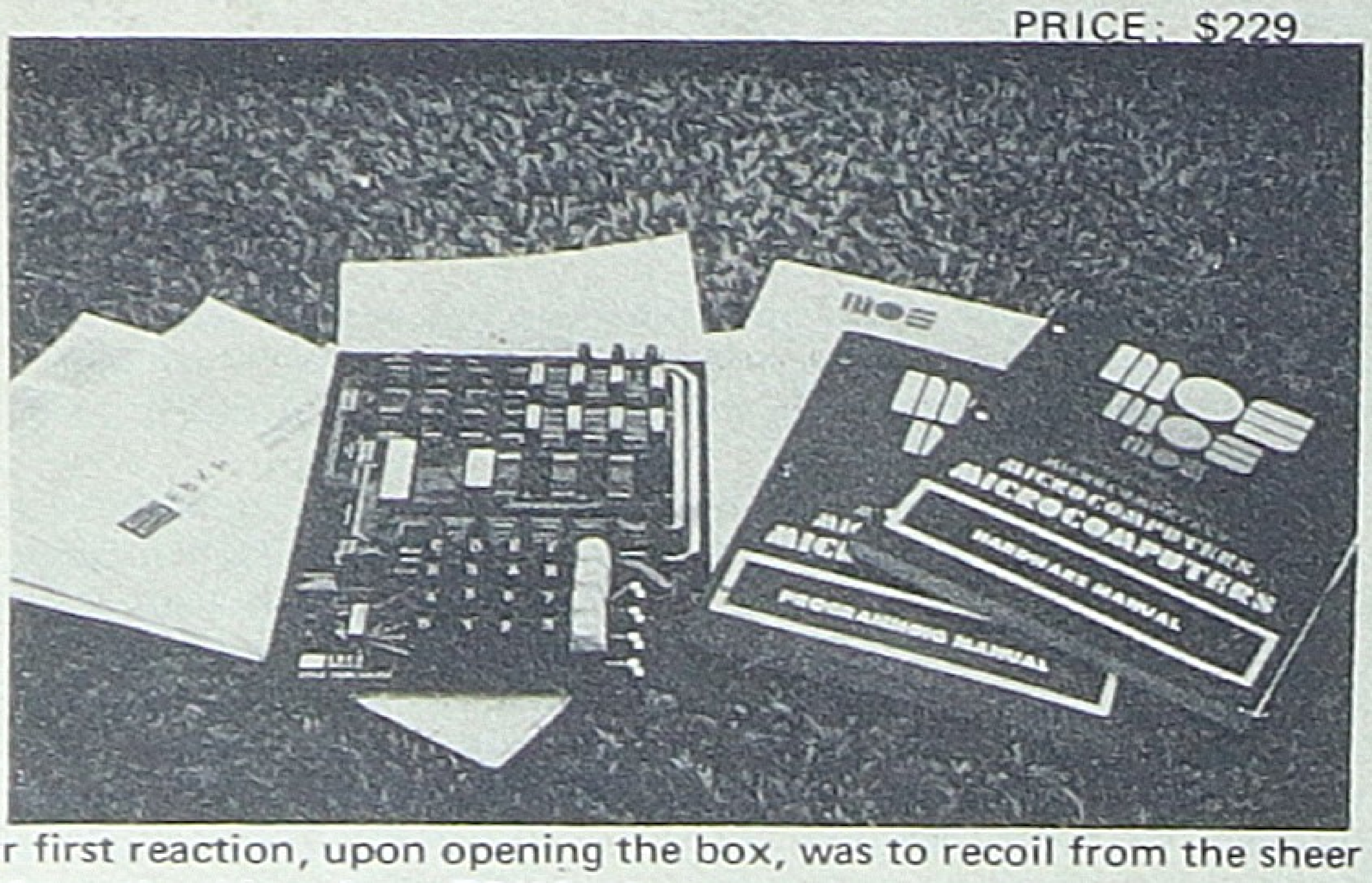
3

```
99 REM  A BETTER SOLUTION USING ALGEBRA AND ALTAIR BASIC
100 FOR C=1 TO 16:A=100-6*C:PRINT C,A,100-C-A:NEXT C
```

MOS Technology 6502

PRICE: $229

For Details: EBKA
6920 Melrose La.
Oklahoma City, OK 73127



Kits are appearing from every nook and cranny. Obviously we can't cover them all only significant ones. We have wanted to get our hands on a 6500 based unit for some time, but couldn't afford to buy one. Then Roger Walton of EBKA called us to ask our advertizement rates. We didn't, we explained, publish paid advertizing, nor reprint news releases. But if we heard about something which we felt our readers should know about - we would mention it. And if we were given a copy of a product that was of interest to our readers, we would write about it. Now at first sight this is not much different to paid advertizing - but, as we pointed out to Mr. Walton, with paid advertizing the payer gets to write the copy. If we are given a product for evaluation, *we* write the copy and it isn't necessarily going to *be good for marketing.* That was OK with Mr. Walton, he had confidence in his microcomputer kit, and when it arrived, we found his confidence fully justified.

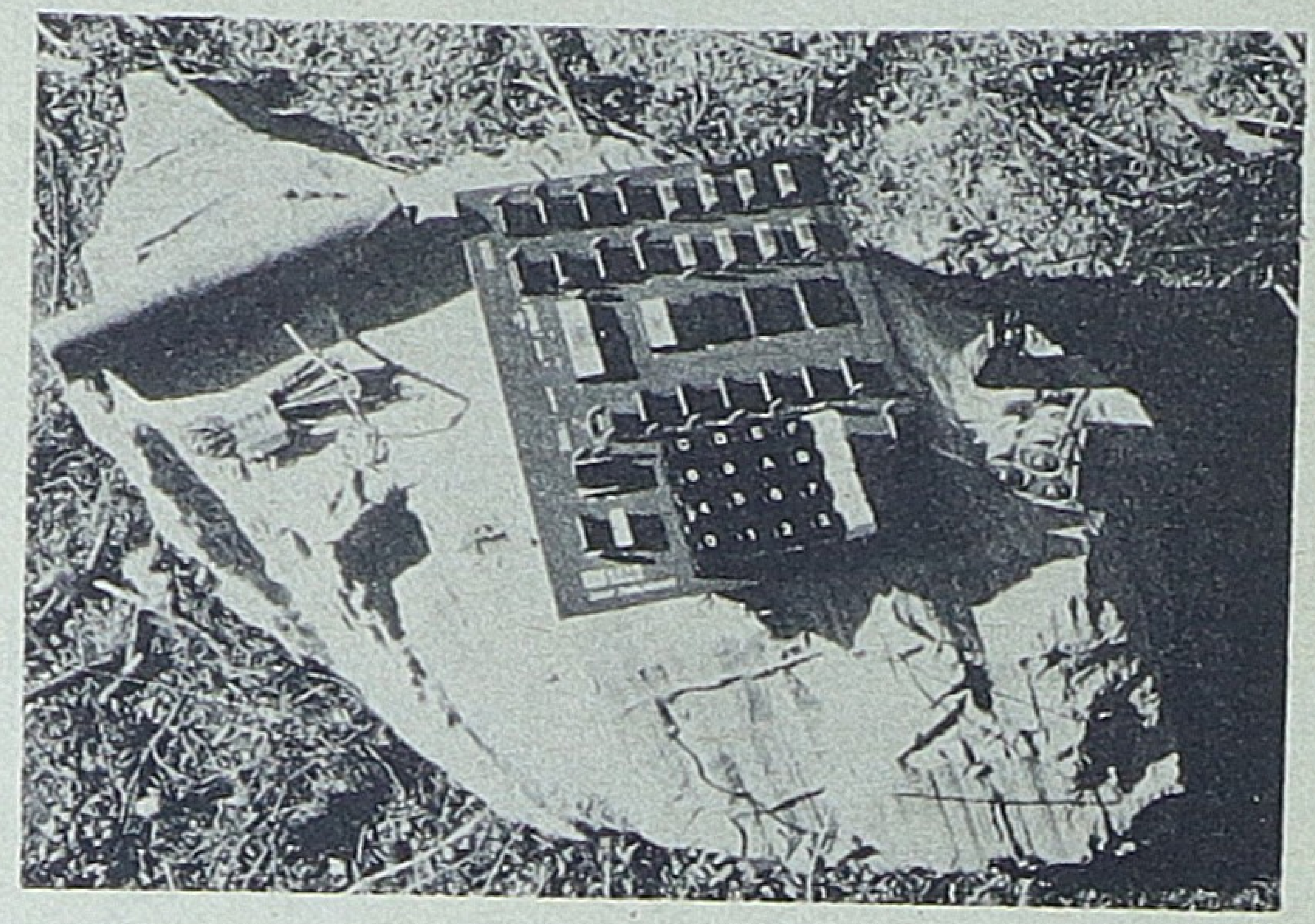
Some computers are intended to be the basis for expansion into substantial systems. Others are intended to merely familiarize the owner with the hardware being used, particularly the CPU. Both this kit and the microtutor below fall into the latter category.

Our first reaction, upon opening the box, was to recoil from the sheer volume of paper. Aside from the things from EBKA, there were two massive manuals from MOS Technology. Closer inspection showed that these manuals were written with commendable simplicity and clarity. Documents of such quality are instructional as well as being references. This was as well, since the instructions regarding assembly and operation were somewhat scanty.

Despite this assembly was almost ludicrously simple since all the chips arrived pressed into a full sized layout sheet and correctly oriented at that. All that was needed was to remove a chip, transfer it to the corresponding position on the PC board and solder it in. Hope more kits makers adopt this idea!!!

All parts are top quality and the kit is a complete unit since it combines (on the single board) hexadecimal keyboard input, two digit hex readout and a monitor in PROM to run it. The kit seems to us to be a fine way to learn about the Microprocessor. It would take quite a bit of work to expand it to a larger system, though that could be done. But since every chip pin is made accessible, it is really well suited to experimentation - for use as a controller, for example. And since it contains 1K RAM and space for 3 - 1702A PROMS in addition to the one used by the monitor, *and runs happily on flashlight batteries,* it is potentially a very powerful controller or data caputer device.

The unit is seen below in a typical household application - being used to monitor crack propagation as a boulder of oil shale is blasted. (Keith Britton earns his living as an explosives consultant. More about this next issue.)



COSMAC

Someone sent this to Bob Albrecht for Christmas. It was designed to teach engineers how to use the RCA COSMAC MICROPROCESSOR. This unit is pretty, but not cheap. On the other hand the manual which accompanies it is priceless. We quote the manual's foreword in full:

Contact you local RCA Distuibutor

Computers can be large, complicated, and hard to understand. **Microtutor** is a computer that is small, simple, inexpensive, and easy to understand. It comprises 256 words of memory, input switches, a two digit output display, and the **RCA COSMAC** microprocessor.

Contrary to popular belief, computers are quite simple in concept and fun to play with. They can also be quite useful, but we'll try not to dwell on this aspect in deference to more sensitive readers. A word of caution if **Microtutor** makes computers seem simple to you, don't tell anyone. You can earn more money perpetuating the computer complexity myth.

Readers who insist on knowing every last detail about **COSMAC** should refer to the **RCA COSMAC MICROPROCESSOR MANUAL**. Readers who want to be protected from actual computer hardware by software aids with names like assembler, interpreter, simulator, and compiler should save up their money for a more expensive system.

J. A. Weisbecker

Figure 6 shows how a relay for a given bit could be driven by the output register. A single relay could be used to let MICROTUTOR provide a teletype output code or a telephone dialing code. Multiple relays would permit simultaneous control of up to eight motor driven rocking chairs.

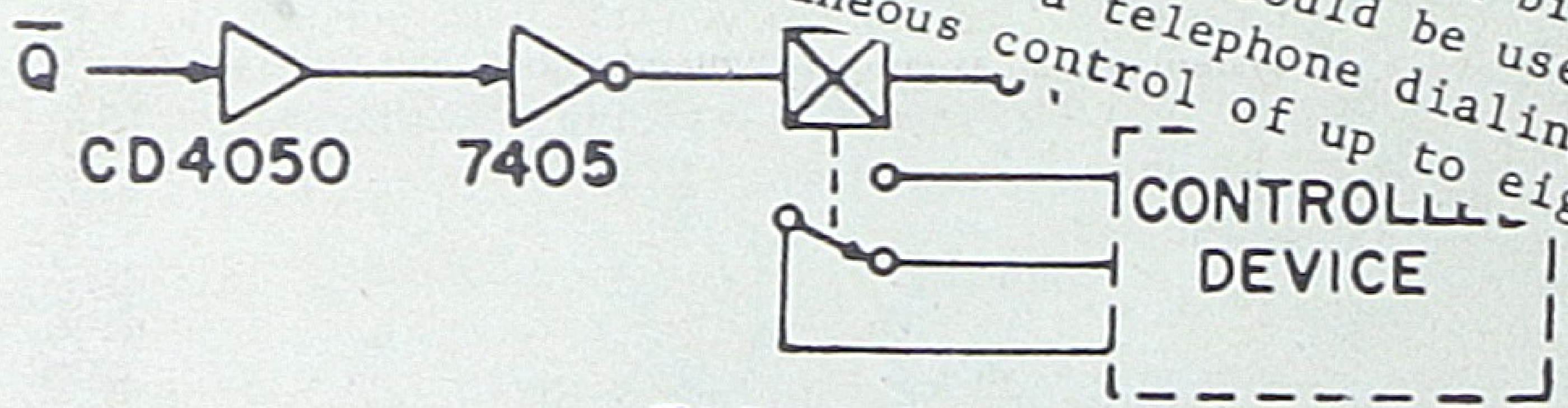
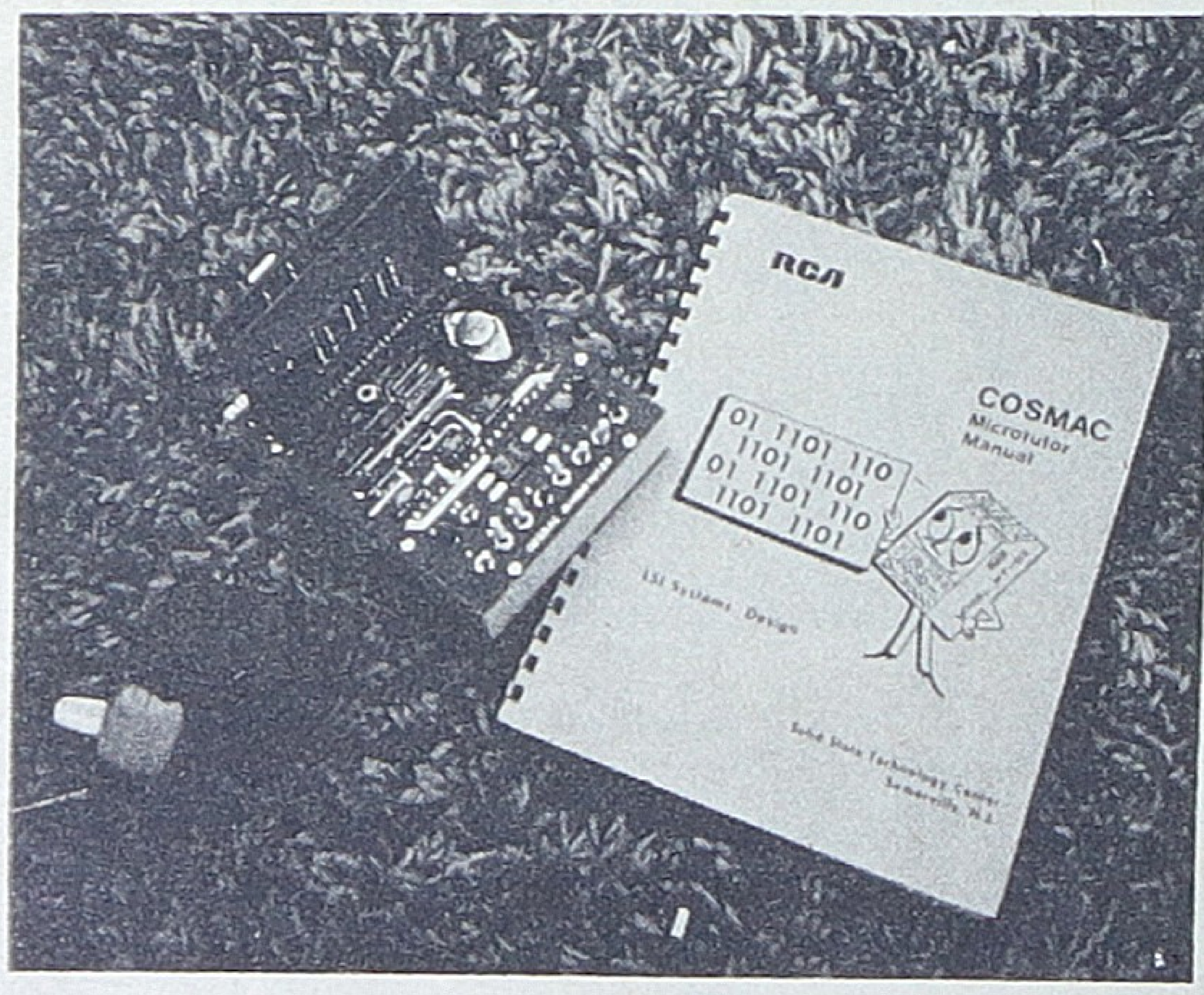


FIGURE 6 - OUTPUT RELAY CIRCUIT



The input/output circuits illus
only as examples. A variety of input/output devices can be
via the external option plug (E). All COSMAC output or input
re available for external use via this plug (See Appendix 3).

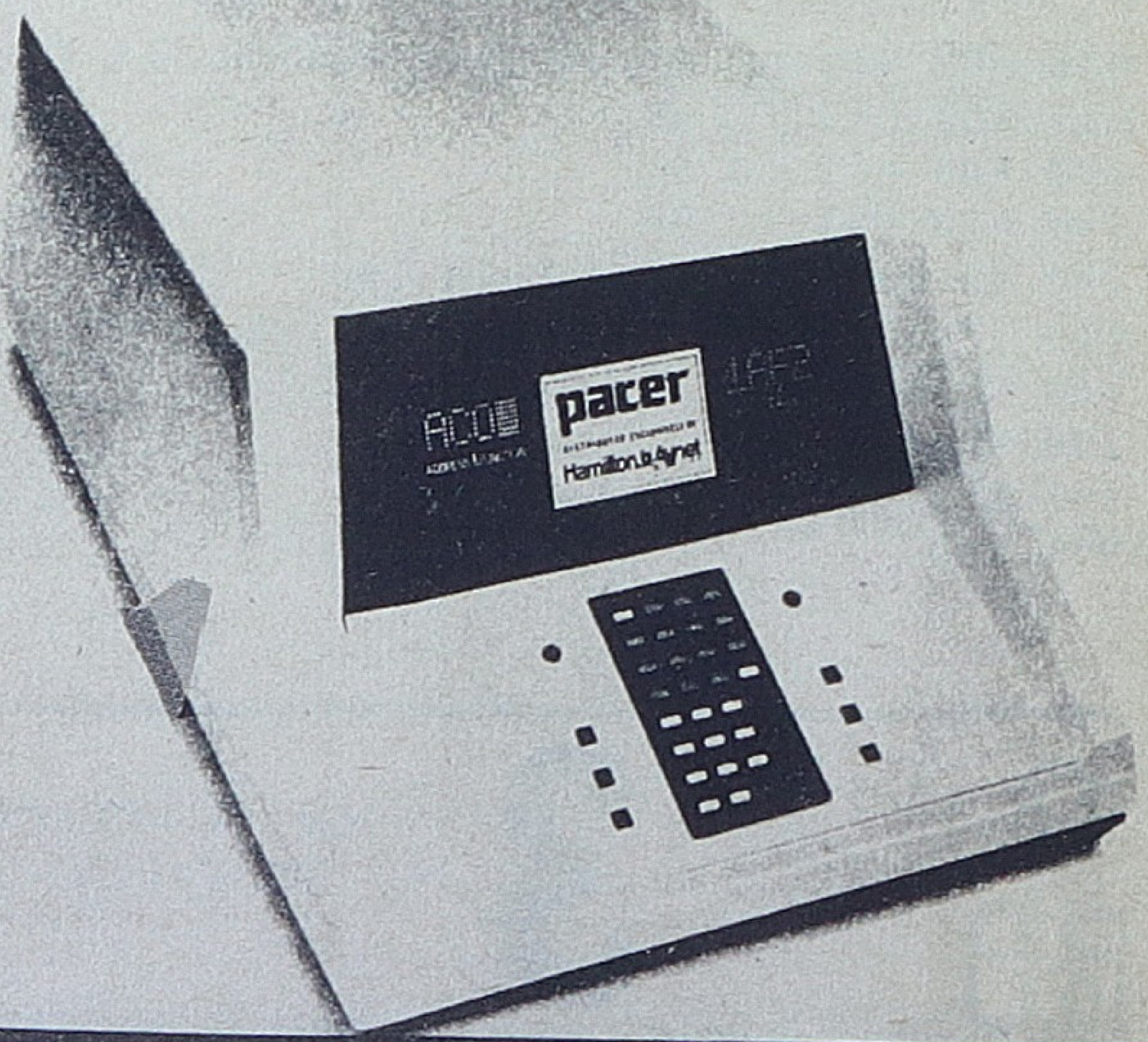
For those readers owning a scope, the external option socket (E)
n opportunity to use it. All sorts of interesting pulses can be
tion socket pins while MICROTUTOR programs are runnin
attached to one of the more interesti
to your next MICROTUTOR

Astute readers, who remained awake during the above discussion, will probably be excitedly shouting that this is the program they loaded and ran in Section I. These readers will be right and should give themselves a programming aptitude score of 0A (decimal 10). The others will still be asleep and upon waking, should give themselves a programming aptitude score of 2F.

PACE

After all this time there *still* isn't a PACE kit available (mostly because of supply problems) but there is much progress to report. Dark horse in the race remains Radio Shack, no information on their progress, but a new contender has appeared - Hamilton Arnet with a machine called PACER. We still expect Bill Godbout to be first though, since his parts orders (the ones holding everyone up) were made eariler than anyone else's. Expect hardware about March 1st.

The real news is not about hardware though. National Semiconductor has made assembler and editor available and has finally decided to produce SM/PL, a PLM-like language. This will be available for reproduction cost to buyers of Godbout's kits and, presumably, to buyers of the others. Not content with this Bill Godbout has commissioned the writing of BASIC for the PACE. This will be a minimum BASIC, 4K words or so, but *public domain and with all the hooks for expansion documented and publicized.* It will be suitable for Implementation in ROM, but may be designed principally for Bill's machine. He would like to get together with his competitors to work out a mutually supported standard - but hasn't been able to reach the right person in either Radio Shack or Hamilton Arnet...



HEAVY PAGE

Every so often we receive a letter at *PCC* which makes us blink. In that category is this one.

I read your piece on pg. 12 of Sept. '75 issue of *PCC*.

I didn't like it.

If you have to run a full pg. article to explain what, exactly, you meant in a previous article, you may as well fold your sheet & open a knitting shop.

PCC loudly proclaims that it is non-profit and unfettered by commercial interests & advertizing - yet it puffs the ilk of MITS/ALTAIR seemingly on every other page; not to mention the free engineering-development work handed them on pg. 12 *loc. cit.*

Anyone who puffs & promotes MITS/ALTAIR as you do either has rocks in his head or MITS' money in his bank account. Don't you realize that every time you print the word *ALTAIR*, whether in a favorable or unfavorable context, it is a free ad for them?

(Perhaps the State of California should be invited to investigate *PCC*'s non-profit status.)

It is patently self-evident that you have never ordered an ALTAIR 8800 or tried to assemble one or get it to work or get any satisfaction from MITS in consequence of same. *Shoemaker stick to your last.*

For your general information, the ALTAIR is vastly over sold and overpriced. MITS is very long on their promises and longer still on delivery; their general efficiency would be more appropriate to the Victorian Era and their sensitivity & responsiveness to consumer needs is positively Neanderthal. (You got a taste of it in your first puff piece [pg. 22, Vol. 3, no.5] but apparently you're a slow learner.)

In the present article (pg. 12, *loc. cit.*) you proclaim MITS'/ALTAIR'S *low price* (end of next to last ¶.) Come down off it already. Who are you trying to kid??? What tree have you been living in?????

There happens to be a company called Motorola. Ever heard of them? They have factories & offices all over the country & the world, but their semiconductor products division is located in Phoenix, Az. They employ 10,000 at that location.

Motorola happens to have been making a CPU chip set called the MC 6800 for about 3 3 or 4 years. It has a broad similarity to Intel's 8080, but is greatly superior in most respects. The MC 6800 is the CPU used in Tektronix's 4051 desk-top computer which has become *the* industry standard. It is also the CPU in Hewlett-Packard's new 9815 & 9830 desk-top machines.

Motorola sell a beginning chip set, memory board, PC board, detailed documentation, programming & applications data. The price of the whole shebang is $150, cash - American. That's essentially the same hardware as ALTAIR *except* for power supply, front panel & cabinet. I repeat $150.

Program that in your ALTAIR, and run it, Charlie.

Then there's the new MOS Technology (Morristown, Pa.) 6501 CPU. Very similar to the MC 6800 though not quite as versatile. Requires *no* cutboard chips - all support functions are implimented with standard TTL IC's. Price of the 6501 CPU is $20 *in single quantites.* I repeat: $20 in quantites of one.

I could go on, about Western Digital's 16-bit <$100 CP 1600 CPU, and about a whole lot more. But I won't. I somehow get the feeling you wouldn't be interested, standing there as you are with your finger up your ALTAIR. After all, what would it give you to write about? I don't think you'll have to run any copy in *PCC* telling Motorola how to modify its MC 6800 processor circuits so they'll work properly.

I will however leave you with this: Wake up Charlie, the train is starting to move.

Ed Edwards
P.O. Box 176
Washington, Mi 48094

PS: Sorry not to have written sooner. It was due to illness - I was sick from seeing your continued sweetheart relationship with MITS.

To our amusement, within 24 hours we received an acrimonious and voluminous blast from Ed Roberts of MITS, who had taken violent exception to the article by Lee Felsenstein in V4 no.2. (At Ed Roberts request we are not printing the letter, with the exception of two paragraphs, which I will come to later.)

Sure, Mr Edwards, we realize that every time we mention the Altair it's an advertisement for MITS. Frankly we feel they deserve it. The Altair 8800 was a pioneering effort and we feel that pioneers deserve both credit and some special consideration. Sure the 8800 has faults. Compare it to the IMSAI. One is a professional unit and the other is not. But compare the 8800 with the other deals you could get *one year ago* and it was just marvellous. Or compare against the 680.

We have, in fact, received little in the way of letters strongly critical of MITS and have published virtually all of them. One notable exception being a letter strikingly similar to Mr Edward's - which was unsigned. While we will withold names on request, *we do not publish unsigned material.*

But to return to Ed Roberts. He felt that the proper place for publication of fixes to MITS' equipment was in MITS users' group newsletter Computernotes. In this we rather agree and will be sending a letter for publication in same. When Lee wrote his original article, Computernotes was not yet the forum it is today. He wished to write a follow up - we could hardly deny him the space. We still feel it to be a pity that Ed declined to reply. We held space for him. We do feel inclined to comment upon one aspect of his correspondence with us:

> It is presumptious and dangerous for PCC or any other group to recommend fundamental design changes to a system such as the Altair. Many of these changes can cause major problems when later peripherals are added to the system. An example is the change to the ready line proposed in the article.

Sometimes MITS seems overly sensitive to criticism, in which they are not alone, but it is surely presumptuous for any designer to assume omnipotence. Especially when the mod. he complains of is endorsed as sound by his own publication.

The following was also worthy of comment:

> Another subject related to this overall objectivity problem is even if you are able to maintain your personal independence, I am sure you must be aware that your close proximity to a few of the manufacturers of products in the small computer industry can very easily color your reality of the problems and the industry. The recent extensive article on the PACE MPU is possibly an example of this sort of problem. Based on detailed internal evaluations we have done on other MPU's, the PACE would certainly have to rank low in the priority of important MPU's for this market. While the PACE certainly deserves space in your PCC, the 6800, 6500 series and F-8 are at least as valuable and interesting to your typical reader.

While it smacks somewhat of Mr. Edwards style, it raises some issues. We try not to trumpet any claim to honesty or commercial non–alignment. We aren't, and do not pretend to be, unbiased. But it is *our personal bias* - not anyone elses. Incidentally, on the subject of chips, PACE continues to look like a real winner to us, and the vigor with which MITS is knocking it reinforces our view.

MITS has also taken a position on software, one not to the liking of Kevin Hess.

People's Computer Company has taken a very interesting stand in the hobby computer field. Honesty. This is most refreshing in an area where rip-offs can and do happen at any time. That is what I am writing about: rip-offs.

Enclosed you will find a xerox copy of an article appearing in the September issue of *Computer Notes*, volume I, issue IV, "Across the Editor's Desk" by David Bunnell. The main theme of this article was to 'tell off' those people who beg, borrow, or steal a copy of Altair 4k or 8k Basic.

I, as I hope many others do, realize the cost of writing and implementing software is quite exorbitant. Often times the development of software is not measured in man-hours but in man-months or man-years. However, a computer is little more than a fancy calculator without peripherals *and software*. Peripherals will always be generally expensive, as electronics will always be generally expensive. Software, on the other hand, can or can not be expensive, depending upon who is writing it (as can be easily seen by PCC's *Tiny Basic*!), or who is covering the cost.

Many things have been said about MITS' hardware, and many people are marketing (at a lower cost) replacement hardware, as well as new hardware. I am not in any way attempting to derogate MITS' hardware. However, MITS' position is very much like International Business Machines. They are the leader of the pack when it comes to microcomputer hardware and software. If MITS is to remain the leader, they had better start acting like a leader when it comes to their relations with customers.

When Altair 4k and 8k Basic first came out, the people who ordered it were first required to sign a licensing agreement. In many people's eyes (and to a large extent mine) MITS does not trust its customers! This is quite a twist from the consumer groups of the early 70's who were trying to protect the *buyers* from *bad business practices*. Maybe MITS should hire Ralph Nader to protect themselves from us mean buyers!!! Unfortunately, I have deviated from the point, and I shall immediately return to it.

MITS is attempting to sell something that most computer installations get effectively for free. For example: if you order an IBM System/370, you at least get an operating system and an assembler (which is more than I can say for MITS). If MITS continues in their business practices, MITS may find that business will dry up (this is not a threat, but a prediction).

It should be noted that many people believe software should be part of public domain (note: MITS just dropped the price of their 8k Basic from $500 to $350. I would like to congratulate MITS on a stumble in the right direction!). MITS' problem is that their software is, more or less, already part of public domain. Let's get with it, MITS, and start using your software as a selling point, instead of a stumbling block for us poor computer hobbyists!

Sincerely yours,
KEVIN HESS

Sorry, Kevin, I feel that MITS have the rights of this one. A good programmer is worth 30K per year - and someone must pay him. Either the cost is loaded onto the hardware or there is a separate charge. IBM offers a package for $900 to $1200 *per month* plus $385 for BASIC, again *per month.* The hobby world can pay for good software *or it will go without.*

Keith Britton

Unfortunately there are too many having bad experiences with suppliers:

After being bitten by the computer bug in January, 1975, with *Popular Electronics*' article on the Altair 8800, I found myself sending a check to MITS one month later. After approximately another month's wait, my computer was received, assembled and running. Now the problem was what to do with this box of blinking lights and how to do it economically.

I have subscribed to virtually every amateur computer publication and have checked their advertisements. One organization which I became interested in after sitting in on Dr. Robert Suding's seminar at the '75 Hamvention in Dayton, was The Digital Group of Denver. Upon realizing the usefulness of cassette tapes as a source of mass storage, I ordered a cassette interface from an advertisement in The Digital Group's flyer. This interface designed by Dr. Robert Suding was supposedly being marketed by a company calling themselves Signal Systems of Colorado Springs, Col. This order was placed August 20, 1975, with my cancelled check returned shortly thereafter. The cassette interface has never been received. Since that date a series of three letters were sent to Signal Systems the last of which was sent certified mail and returned three weeks later stamped "Not deliverable as addressed, unable to forward." This has been brought to the attention of the postmaster and is awaiting further action.

The purpose of this letter is to prevent my fellow computer hobbyists from the same pitfall and to advise caution when dealing with The Digital Group and Signal Systems. As a final note, Dr. Suding's calculator interface is being marketed by Mini Micro Mart of Syracuse, N.Y., that the November issue of *People's Computer Company* speaks of in saying:

"Clear bottom was Mini Micro Mart and, in view of their reputation, we will not waste space on their address."

Yours truly,
ERIC BJORNSEN

Alpha-Numeric Music with Amplitude Control

A xeroxed booklet from PCC $2.

By: M. T. Wright

PCC attends most of the Bay Area hobby club meetings. At the Homebrew Club someone came up to us and asked if we were still interested in computer music. He proffered, somewhat diffidently, a 22 page manuscript. His name is Malcom Wright *and his program is the most attractive music scheme we have yet seen.*

His manuscript was not only complete - explanation, listing, hardware diagrams - but really pretty, produced with the same care and attention to detail evident in his program. Although it was designed for the Altair, the methods used are applicable to other machines.

Unfortunately, we didn't have the space to do this justice, and we didn't want to hold it for a later issue in view of the value of its ideas to others working on similar projects. So we hope to feature it in a future issue, and are meanwhile making it available as a xeroxed booklet via the bookstore.

KB

It's interesting that I should make a music routine my first major programming effort, but maybe I was hoping to make the computer more of a crowd pleaser with the limited peripheral hardware I had at the time. It was obvious the programming problems would be challenging, since I am just learning the machine instructions for the 8080 CPU and I cannot read music. Of course, one can approach programming and music with the same basic premise: "they are both just a coding & decoding problem"! I am sure that many of you will be able to simplify and improve on this music program after you understand the basic principles that lie within it.

The Alpha-Numeric Music program that will be discussed in the following pages was written for the Altair 8800 computer with a ASCII (upper & lower case) keyboard and one 8-bit output port feeding an amplifier thru some resisters. The output port circuit will be described later on in this article.

After writing nine different music routines for my 8080 CPU, it became obvious that the frequency range and sound quality of the music would be determined by writing a flexible square-wave output routine. The square-wave routine should be made short to increase running speed which will determine the maximum frequency, and it should be written with CPU timing in mind to eliminate noises due to long routines that would upset the symmetry of the square-wave. Therefore the greatest evolution in all of the different music programs was a section called Play-Note which generated the binary coded square-wave.

Play-Note

The routine called Play-Note uses all of the registers in the 8080 CPU and also the memory stack. Play-Note uses register-C to set the time for a half-cycle of the square wave to be generated. Registers D&E are used to count the number of half-cycles which will set the duration of the note played. Register-B is used to count the number of segments that make-up an envelope of a note. Registers H&L are used to point at a table in memory which gives the values for the amplitude of the envelope of the square-wave. Register-A is loaded with the amplitude of the envelope. The stack is used to save the present working address of the music table and save intermediate register values for the Play-Note routine.

Main Program Architecture

The music can be broken down into four main parts (1) character search, 144 bytes,(2) perform character routine, 385 bytes,(3) table look-up, 307 bytes, and (4) play-note routine, 71 bytes.

𝄽 ...Quarter rest(QR)

𝄾 ...Eighth rest(OR)

𝄼 ...Half rest(HR)

𝄻 ...Whole rest(WR)

♭ ...Flat (b)

♯ ...Sharp (#)

♮ ...Natural (cancels a sharp or flat)

𝄀 ...Measure separator(/)

𝅝 ...Whole note(W)

𝅗𝅥 ...Half note(H)

♩ ...Quarter note(Q)

♪ ...Eighth note(O)

𝅘𝅥𝅯 ...Sixteenth note(S)

𝅘𝅥𝅰 ...Thirtysecond note(T)

♩. ...Increase note duration by 50%. (CTRL-A)

𝄆 ...Repeat (between these brackets repeat the measures as indicates.) (CTRL-R,CTRL-J,CTRL-S)

Before a program listing is presented, it should pointed out that two sections of the look-up table have been left open to be defined by the User. One is the Tempo table from 002,370 to 003,023 for a tempo other than the three already listed. The table holds two-byte duration values for a segment of a whole note in the sixth octave. The Envelope table from 003,247 to 003,312 is free for four more envelopes each of nine bytes long. The envelope table routine uses even parity to identify the end of each envelope, so remember to make all binary patterns equal odd parity except for the ninth byte.

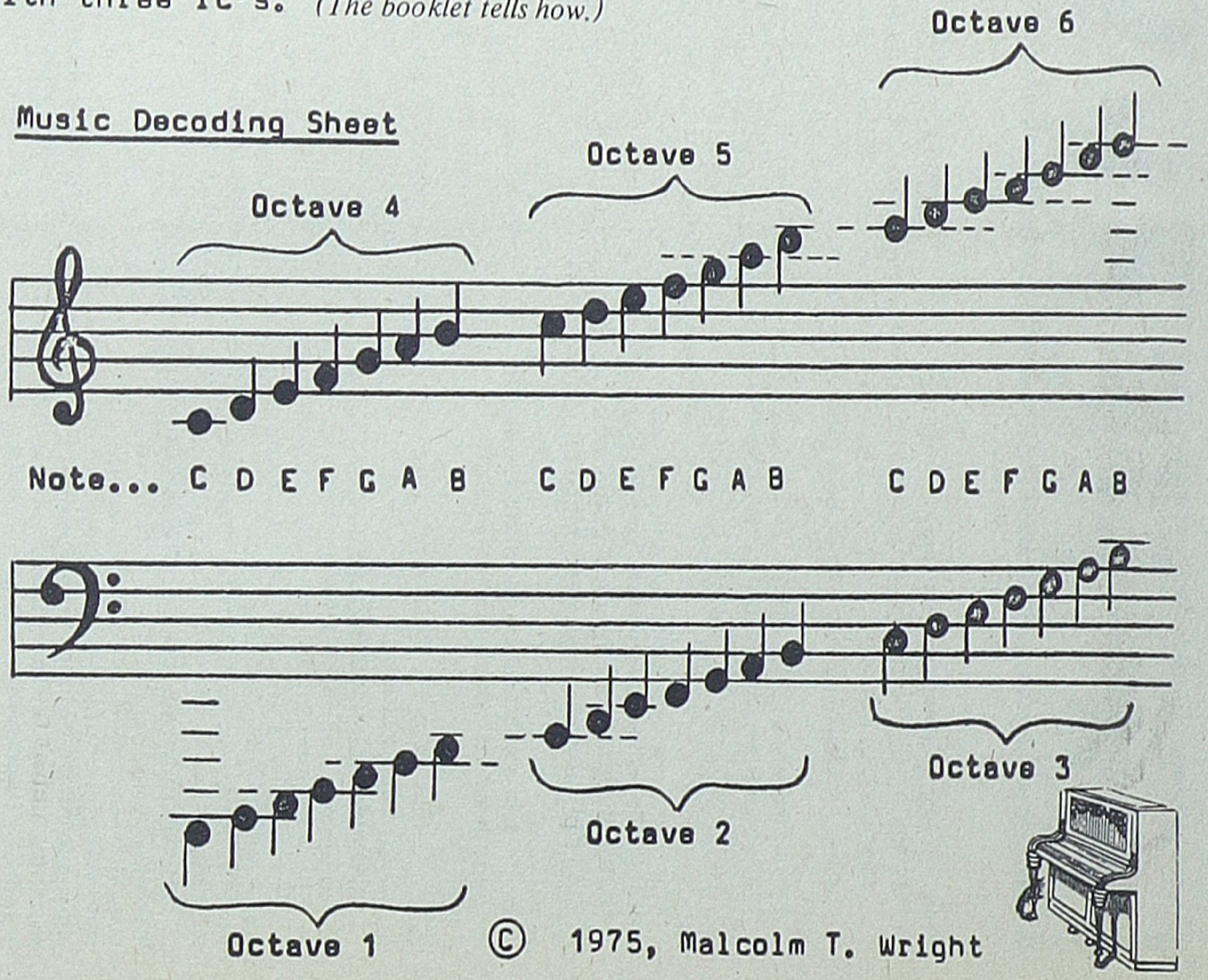
Music Table Coding

Now in the beginning the music programs were difficult to code into the computer because all of the frequencies had to be looked up and decoded from tables by the User into binary values. The Alpha-Numeric Music program removes some of the difficult decoding tasks by placing tables within the memory and letting the CPU do the looking up.

Hardware

To hear the results of this software music program, a port with a 5-bit DAC(Digital-to-Analog Converter) will have to be added to the computer. If you do not have a 8-bit parallel output port, one can be built with three IC's. *(The booklet tells how.)*

Music Decoding Sheet



© 1975, Malcolm T. Wright

A Game Based on... STAR TREK®

Reprinted from *What To Do After You Hit Return or P.C.C.'s First Book of Computer Games*
See Bookstore page for additional information.

AS CAPTAIN OF THE *ENTERPRISE*, YOUR MISSION IS TO FIND AND DESTROY ALL UNITS OF THE KLINGON INVASION FORCE WITHIN 30 STARDATES. IF YOU FAIL, THE FEDERATION WILL BE CONQUERED.

Your ship, the *ENTERPRISE*, is much more powerful than the Klingon battle cruisers. But beware! Space battle drains your ship of energy and it is not easy to find the Starbases. If the Klingons catch you with your shields down, you'll probably get crisped!

Think of Starbases as interstellar pit stops, where the *ENTERPRISE* refuels (energy goes back to 3000), damages are repaired, and your photon torpedoes are reloaded (back to 10).

Because the Klingon ships are scattered throughout the galaxy, you'll be navigating the *ENTERPRISE* all over the place.

The galaxy is divided into quadrants – there are 64 of them, and they make a checkerboard. Give COMMAND 7, then COMPUTER COMMAND 0 and you'll get a galactic map printed – up to date, of course; it shows those parts of the galaxy you've already explored.

Each quadrant is divided into 64 sectors. You guessed it – they're arranged 8–by–8. Each time you move, you get a short-range sensor scan printed – that's a map of the quadrant you're in. If you want to see what's in your neighboring quadrants, either go there, or get a long range sensor scan.

Oh yes – it takes 1 stardate to move to a new quadrant, and you *must* defeat the Klingons in 30 stardates or less.

HERE ARE YOUR CONTROL COMMANDS

```
COMMAND 0 = WARP ENGINE CONTROL
COMMAND 1 = SHORT RANGE SENSOR SCAN
COMMAND 2 = LONG RANGE SENSOR SCAN
COMMAND 3 = PHASER CONTROL
COMMAND 4 = PHOTON TORPEDO CONTROL
COMMAND 5 = SHIELD CONTROL
COMMAND 6 = DAMAGE CONTROL REPORT
COMMAND 7 = LIBRARY COMPUTER
```

SHORT-RANGE SENSORS SHOW THESE SYMBOLS

```
<*> = ENTERPRISE
+++ = KLINGON
>!< = STARBASE
 *  = STAR
```

* * *

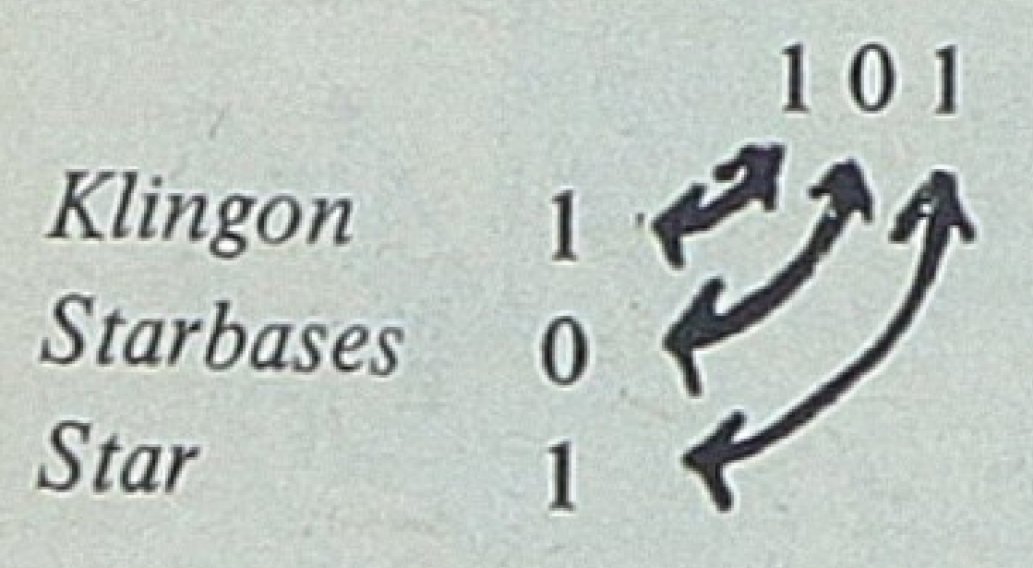
ON THE NEXT FOUR PAGES, I'LL SHOW YOU A GAME I PLAYED RECENTLY –

```
YOU MUST DESTROY 16    KLINGONS IN 30    STARDATES WITH 4     STARBASES

---------------------------------
      *
      *           *                     STARDATE         3000
              *           *             CONDITION        GREEN
                                        QUADRANT         8,1
                                        SECTOR           7,7
                                        ENERGY           3000
      *                  <*>            PHOTON TORPEDOES 10
  *                                     SHIELDS             0
---------------------------------
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 8,1
-----------------
:   0 :  11 :   2 :
-----------------
:   0 :   7 :101 :
-----------------
:   0 :   0 :   0 :
-----------------
```

This'll be an easy game – only 16 klingons – and I've lots of Starbases to refuel at.

aha! Klingons due East



```
COMMAND 2 = LONG RANGE SENSOR SCAN
  SHOWS CONDITIONS IN SPACE FOR ONE QUADRANT ON EACH SIDE
  OF THE ENTERPRISE IN THE MIDDLE OF THE SCAN.  THE SCAN
  IS CODED IN THE FORM XXX, WHERE THE UNITS DIGIT IS THE
  NUMBER OF STARS, THE TENS DIGIT IS THE NUMBER OF STAR-
  BASES, THE HUNDREDS DIGIT IS THE NUMBER OF KLINGONS.
```

```
COMMAND:?0
COURSE (1-9):?1
WARP FACTOR (0-8):?1
COMBAT AREA      CONDITION RED
   SHIELDS DANGEROUSLY LOW
---------------------------------

                                        STARDATE         3001
                 +++                    CONDITION        RED
                                        QUADRANT         8,2
                                        SECTOR           7,7
                                        ENERGY           2997
                         <*>            PHOTON TORPEDOES 10
          *                             SHIELDS             0
---------------------------------
COMMAND:?5
ENERGY AVAILABLE = 2997      NUMBER OF UNITS TO SHIELDS:?1000
```

I arrive in a combat quadrant with no energy in my shields

Don't fire before putting up your shields – you'll get crisped !

```
COMMAND 5 = SHIELD CONTROL
  DEFINES NUMBER OF ENERGY UNITS TO BE ASSIGNED TO SHIELDS
  ENERGY IS TAKEN FROM TOTAL SHIP'S ENERGY.
```

When you navigate, *you choose a direction* (COURSE) *and then decide how far you want to go* (WARP FACTOR) *– that's two decisions, so here are two paragraphs :*

COURSE : *East is 1, North 3 and you can figure the rest yourself from the diagram. Of course, NorthWest (between 3 and 5) is 4. You can get finer directions by using decimal fractions – between South (7) and SouthEast(8) are 7.1, 7.2, 7.3, . . . , 7.8, 7.9 I rarely use finer* COURSE *settings, such as 7.125 ... Between 8 and 1, use 8.1, 8.2, ... , 8.9*

WARP FACTOR : *If you set your warp factor to 1, you move 1 full quadrant and end up the next one over. 2 skips you over the neighboring quadrant and you'll stop in the one past it. *** WARNING *** If you go out of the known galaxy, you will find no stars (0) and may have trouble getting back. To maneuver within a quadrant, use numbers less than 1; .5 will move you half a quadrant, or 4 sectors. Since there are 8 sectors across a quadrant, each 1/8 warp factor (or .125 in decimal) moves you 1* sector.

```
COMMAND 0 = WARP ENGINE CONTROL
  'COURSE IS IN A CIRCULAR NUMERICAL
  VECTOR ARRANGEMENT AS SHOWN.
  INTERGER AND REAL VALUES MAY BE
  USED.  THEREFORE COURSE 1.5 IS
  HALF WAY BETWEEN 1 AND 2.

  A VECTOR OF 9 IS UNDEFINED, BUT
  VALUES MAY APPROACH 9.

  ONE 'WARP FACTOR' IS THE SIZE OF
  ONE QUADRANT.  THEREFORE TO GET
  FROM QUADRANT 6,5 TO 5,5 YOU WOULD
  USE COURSE 3, WARP FACTOR 1
```

```
 4  3  2
  \ ' /
   \'/
5 ------ 1
   /'\
  / ' \
 6  7  8

 COURSE
```

Warp Engine Control is a fancy name for NAVIGATION.

* *

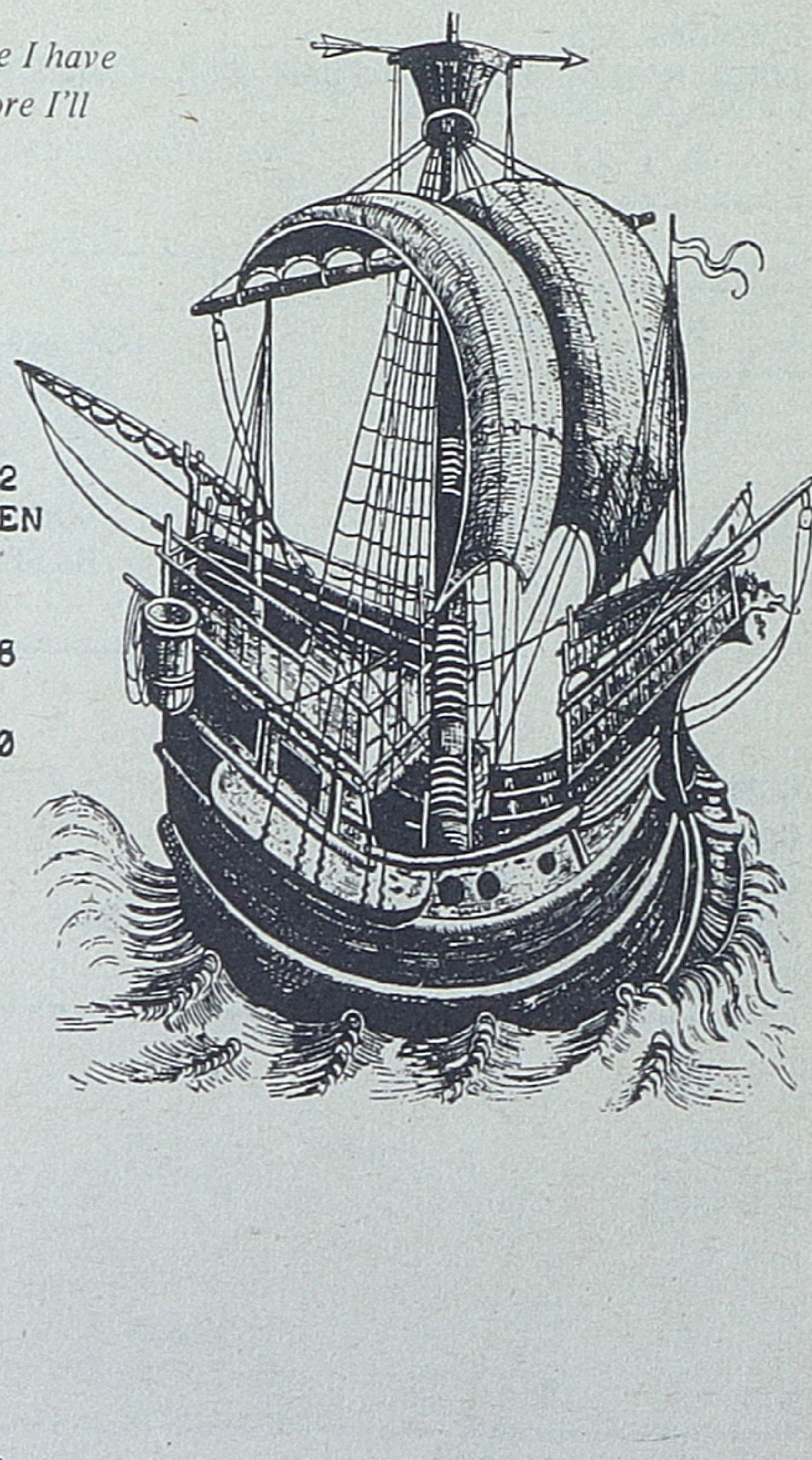
```
COMMAND:?3
PHASERS LOCKED ON TARGET.  ENERGY AVAILABLE= 1997
NUMBER OF UNITS TO FIRE:?600
  81 UNIT HIT ON ENTERPRISE AT SECTOR 3,5   ( 919 LEFT)
  31 UNIT HIT ON KLINGON AT SECTOR 3,5   (169 LEFT)
COMMAND:?3
PHASERS LOCKED ON TARGET.  ENERGY AVAILABLE= 1397
NUMBER OF UNITS TO FIRE:?600
  49 UNIT HIT ON ENTERPRISE AT SECTOR 3,5   ( 870 LEFT)
 214 UNIT HIT ON KLINGON AT SECTOR 3,5   (-45 LEFT)
KLINGON AT SECTOR 3,5 DESTROYED ****
```

↖ *Hits reduce the shield levels until . . . there's nothing left . . .* ↖

```
COMMAND 3 = PHASER CONTROL
  ALLOWS YOU TO DESTROY THE KLINGONS BY HITTING HIM WITH
  SUITABLY LARGE NUMBERS OF ENERGY UNITS TO DEPLETE HIS
  SHIELD POWER.  KEEP IN MIND THAT WHEN YOU SHOOT AT
  HIM, HE GONNA DO IT TO YOU TOO.
```

```
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 8,2
-----------------
: 11 :  2 :  3 :
-----------------
:  7 :  1 :  8 :
-----------------
:  0 :  0 :  0 :
-----------------
COMMAND:?0
COURSE (1-9):?2
WARP FACTOR (0-8): 3
---------------------------------
        *
                                    STARDATE          3002
                                    CONDITION         GREEN
                                    QUADRANT          5,5
                                    SECTOR            7,7
                                    ENERGY             778
                        <*>         PHOTON TORPEDOES  10
                                    SHIELDS            870
---------------------------------
```

I'm looking around for some more Klingons. I figure I have enough energy and torpedoes left for 4 or 5 more before I'll have to find a Starbase.



```
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 5,5
-----------------
:  7 :  1 :  1 :
-----------------
:  2 :  1 :101 :
-----------------
:  2 :  5 :  1 :
-----------------
COMMAND:?0
COURSE (1-9):?1
WARP FACTOR (0-8):?1
---------------------------------

                                    STARDATE          3003
                     *  +++         CONDITION         RED
                                    QUADRANT          5,6
                                    SECTOR            7,7
                                    ENERGY             775
                        <*>         PHOTON TORPEDOES  10
                                    SHIELDS            870
---------------------------------
```

none here . . .

. . . but my sensors spot one due East

```
COMMAND:?4
TORPEDO COURSE (1-9):?3
TORPEDO TRACK:
               6,7
               5,7
               4,7
               3,7
*** KLINGON DESTROYED ***
```

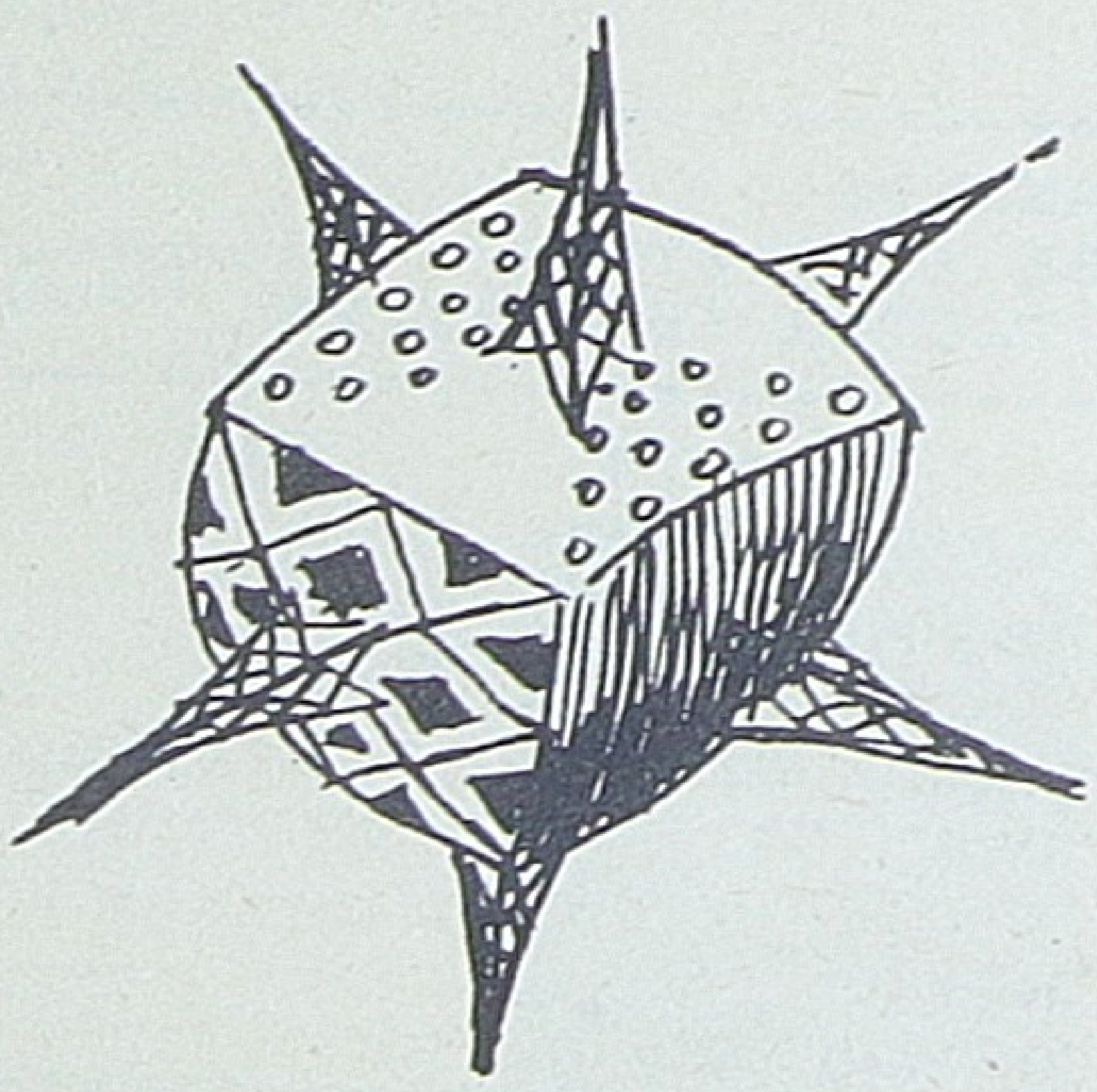
This was an easy shot – the Klingon was due North

```
COMMAND 4 = PHOTON TORPEDO CONTROL
  COURSE IS THE SAME AS USED IN WARP ENGINE CONTROL
  IF YOU HIT THE KLINGON, HE IS DESTROYED AND CANNOT FIRE
  BACK AT YOU.  IF YOU MISS, HE WILL SHOOT HIS PHASERS AT
  YOU.
   NOTE: THE LIBRARY COMPUTER (COMMAND 7) HAS AN OPTION
   TO COMPUTE TORPEDO TRAJECTORY FOR YOU (OPTION 2).
```

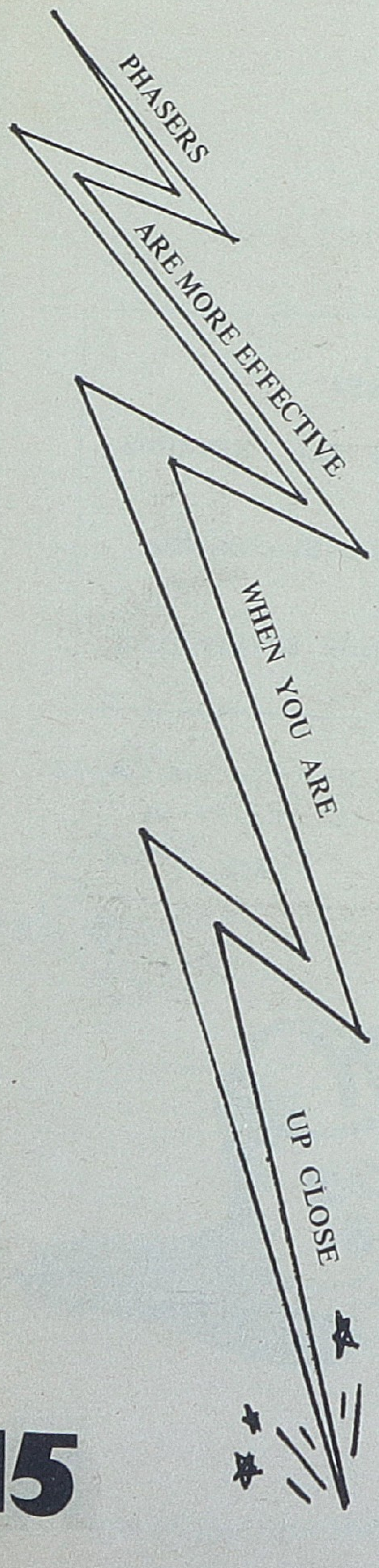
```
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 5,6
-------------------
:   1 :   1 :   4 :
-------------------
:   1 :   1 :   6 :
-------------------
:   5 :   1 :105 :
-------------------
COMMAND:?0
COURSE (1-9):?8
WARP FACTOR (0-8):?1
---------------------------------

                +++  *                 STARDATE             3004
                                       CONDITION            RED
    *                                  QUADRANT             6,7
                                       SECTOR               7,7
    *                      <*>         ENERGY                772
    *   *                              PHOTON TORPEDOES     9
---------------------------------      SHIELDS              870
COMMAND:?4
TORPEDO COURSE (1-9):?3.2
TORPEDO TRACK:
               6,7
               5,7
               4,6
               3,6
               2,6
*** KLINGON DESTROYED ***
```

Back to looking around – I have to go SouthEast to reach the next one.

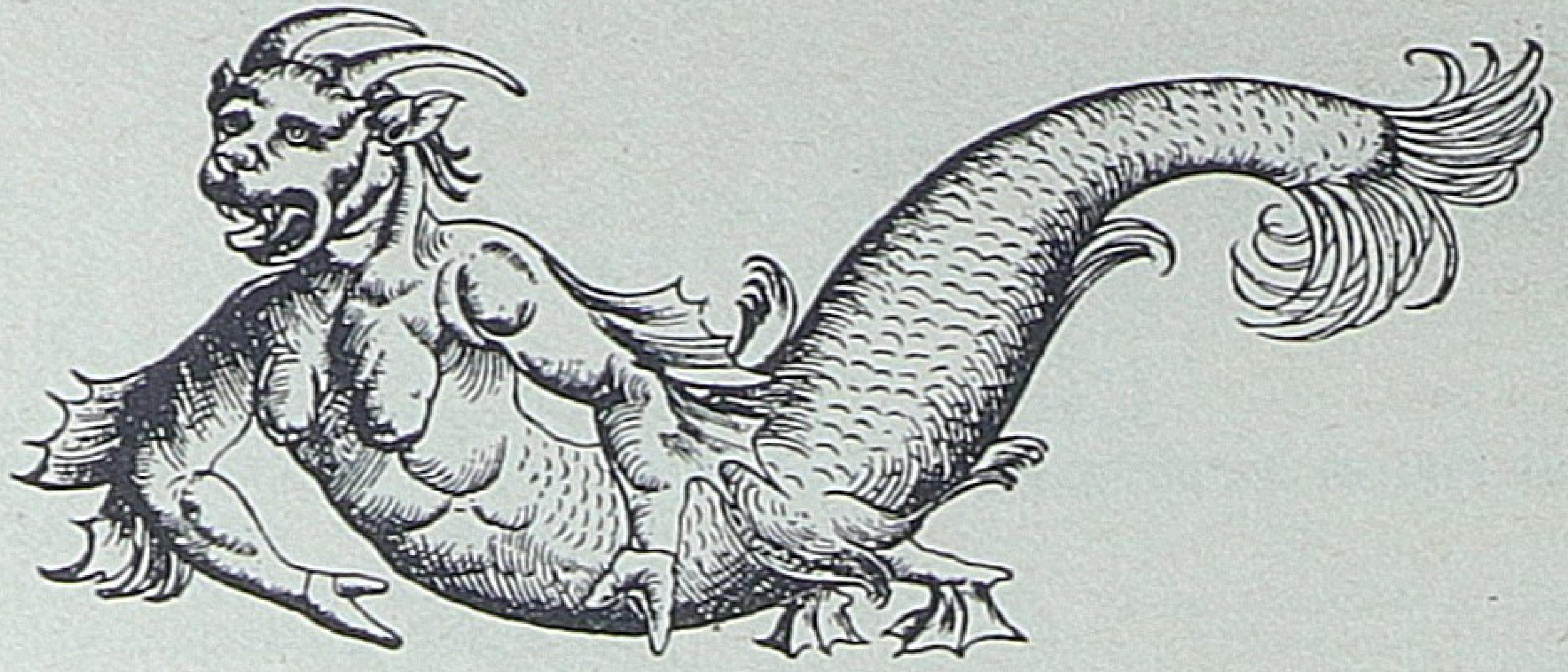


COURSE 3.2 – *a bit West of due North*



```
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 6,7
-------------------
:   1 :   6 :   5 :
-------------------
:   1 :   5 :   6 :
-------------------
:   6 :104 :   5 :
-------------------
COMMAND:?0
COURSE (1-9):?7
WARP FACTOR (0-8):?1
---------------------------------
 +++                    *
                                        STARDATE             3005
                                        CONDITION            RED
                                        QUADRANT             7,7
                                        SECTOR               7,7
                                *       ENERGY                769
                       *  <*>           PHOTON TORPEDOES     8
              *                         SHIELDS              870
---------------------------------
COMMAND:?0
COURSE (1-9):?4
WARP FACTOR (0-8):?.75
  32 UNIT HIT ON ENTERPRISE AT SECTOR 1,1   ( 839 LEFT)
 WARP ENGINES SHUTDOWN AT SECTOR 1,1 DUE TO BAD NAVIGATION
---------------------------------
 +++                    *
     <*>
                                        STARDATE             3005
                                        CONDITION            RED
                                        QUADRANT             7,7
                                        SECTOR               2,2
                                *       ENERGY                768
                        *               PHOTON TORPEDOES     8
              *                         SHIELDS              839
---------------------------------
COMMAND:?3
PHASERS LOCKED ON TARGET.  ENERGY AVAILABLE= 768
NUMBER OF UNITS TO FIRE:?200
  79 UNIT HIT ON ENTERPRISE AT SECTOR 1,1   ( 759 LEFT)
 167 UNIT HIT ON KLINGON AT SECTOR 1,1   ( 33 LEFT)
COMMAND:?3
PHASERS LOCKED ON TARGET.  ENERGY AVAILABLE= 568
NUMBER OF UNITS TO FIRE:?50
  46 UNIT HIT ON ENTERPRISE AT SECTOR 1,1   ( 714 LEFT)
  52 UNIT HIT ON KLINGON AT SECTOR 1,1   (-19 LEFT)
KLINGON AT SECTOR 1,1 DESTROYED ****
```

by the way – the Enterprise's computer banks are storing all the Long Range Sensor scans I've taken.



```
COMMAND:?2
LONG RANGE SENSOR SCAN FOR QUADRANT 7,7
-----------------
:   1 :  5 :  6 :
-----------------
:   6 :  4 :  5 :
-----------------
:  15 :  4 :  7 :
-----------------
COMMAND:?0
COURSE (1-9):?6
WARP FACTOR (0-8):?1
---------------------------------
               *      >!<
    <*>   *                           STARDATE          3006
                                      CONDITION         GREEN
                   *                  QUADRANT          8,6
                                      SECTOR            2,2
               *                      ENERGY             515
          *                           PHOTON TORPEDOES  8
                                      SHIELDS            714

---------------------------------
```

hey! a Starbase! *there it is*

```
COMMAND:?0
COURSE (1-9):?8
WARP FACTOR (0-8):?.25
---------------------------------
               *      >!<
          *                           STARDATE          3006
                                      CONDITION         GREEN
             <*>   *                  QUADRANT          8,6
                                      SECTOR            4,4

               *                      ENERGY             518
          *                           PHOTON TORPEDOES  8
                                      SHIELDS            714

---------------------------------
```

first I navigate UNDER the two stars in my way,
now I can warp straight in and dock

```
COMMAND:?0
COURSE (1-9):?2
WARP FACTOR (0-8):?.35

DAMAGE CONTROL REPORT:COMPUTER      STATE OF REPAIR IMPROVED

SHIELDS DROPPED FOR DOCKING PURPOSES
---------------------------------
               *      >!<
          *           <*>             STARDATE          3006
                                      CONDITION         DOCKED
                   *                  QUADRANT          8,6
                                      SECTOR            2,6
                                      ENERGY            3000
               *                      PHOTON TORPEDOES 10
          *                           SHIELDS              0

---------------------------------


COMMAND:?7
COMPUTER ACTIVE AND AWAITING COMMAND?1

   STATUS REPORT

NUMBER OF KLINGONS LEFT = 12
NUMBER OF STARDATES LEFT = 24
NUMBER OF STARBASES LEFT = 4

DEVICE         STATE OF REPAIR
WARP ENGINES     0
S.R. SENSORS     0
L.R. SENSORS     0
PHASER CNTRL     0
PHOTON TUBES     0
DAMAGE CNTRL     0
SHIELD CNTRL     0
COMPUTER         5.22258
```

```
COMMAND 7 = LIBRARY COMPUTER
  THE LIBRARY COMPUTER CONTAINS THREE OPTIONS:
    OPTION 0 = CUMULATIVE GALACTIC RECORD
     SHOWS COMPUTER MEMORY OF THE RESULTS OF ALL PREVIOUS
     LONG RANGE SENSOR SCANS
    OPTION 1 = STATUS REPORT
     SHOWS NUMBER OF KLINGONS, STARDATESC AND STARBASES
     LEFT.
    OPTION 2 = PHOTON TORPEDO DATA
     GIVES TRAJECTORY AND DISTANCE BETWEEN THE ENTERPRISE
     AND ALL KLINGONS IN YOUR QUADRANT
```

```
COMMAND:?7
COMPUTER ACTIVE AND AWAITING COMMAND?0
COMPUTER RECORD OF GALAXY FOR QUADRANT 8,6
      1     2     3     4     5     6     7     8
    ----- ----- ----- ----- ----- ----- ----- -----
1     0     0     0     0     0     0     0     0
    ----- ----- ----- ----- ----- ----- ----- -----
2     0     0     0     0     0     0     0     0
    ----- ----- ----- ----- ----- ----- ----- -----
3     0     0     0     0     0     0     0     0
    ----- ----- ----- ----- ----- ----- ----- -----
4     0     0     0     7     1     1     4     0
    ----- ----- ----- ----- ----- ----- ----- -----
5     0     0     0     2     1     1     6     5
    ----- ----- ----- ----- ----- ----- ----- -----
6     0     0     0     2     5     1     5     6
    ----- ----- ----- ----- ----- ----- ----- -----
7    11     2     3     0     0     6     4     5
    ----- ----- ----- ----- ----- ----- ----- -----
8     7     1     8     0     0    15     4     7
    ----- ----- ----- ----- ----- ----- ----- -----
COMMAND:?
```

HOW CAN WE CONVERT
STTRI TO A
PEACE GAME ?

STTR I listing

```
1   REM ****  HP BASIC PROGRAM LIBRARY  ********************************
2   REM
3   REM       STTR1: STAR TREK
4   REM
5   REM       36243  REV B  --  10/73
6   REM
7   REM ****  CONTRIBUTED PROGRAM  *************************************
100  REM ******************************************************************
110  REM ***                                                            ***
120  REM ***     STAR TREK: BY MIKE MAYFIELD, CENTERLINE ENGINEERING    ***
130  REM ***                                                            ***
140  REM ***        TOTAL INTERACTION GAME - ORIG. 20 OCT 1972
150  REM ***                                                            ***
160  REM ******************************************************************
170  GOSUB 5460
180  PRINT "                            STAR TREK "
190  PRINT "DO YOU WANT INSTRUCTIONS (THEY'RE LONG!)";
200  INPUT A$
210  IF A$ <> "YES" THEN 230
220  GOSUB 5820
230  REM *****  PROGRAM STARTS HERE *****
240  Z$="                                                              "
250  GOSUB 5460
260  DIM G[8,8],C[9,2],K[3,3],N[3],Z[8,8]
270  DIM C$[6],D$[72],E$[24],A$[3],Q$[72],R$[72],S$[48]
280  DIM Z$[72]
290  T0=T=INT(RND(1)*20+20)*100
300  T9=30
310  D0=0
320  E0=E=3000
330  P0=P=10
340  S9=200
350  S=H8=0
360  DEF FND(D)=SQR((K[I,1]-S1)↑2+(K[I,2]-S2)↑2)
370  Q1=INT(RND(1)*8+1)
380  Q2=INT(RND(1)*8+1)
390  S1=INT(RND(1)*8+1)
400  S2=INT(RND(1)*8+1)
410  T7=TIM(0)+60*TIM(1)
420  C[2,1]=C[3,1]=C[4,1]=C[4,2]=C[5,2]=C[6,2]=-1
430  C[1,1]=C[3,2]=C[5,1]=C[7,2]=C[9,1]=0
440  C[1,2]=C[2,2]=C[6,1]=C[7,1]=C[8,1]=C[8,2]=C[9,2]=1
450  MAT D=ZER
460  D$="WARP ENGINESS.R. SENSORSL.R. SENSORSPHASER CNTRL"
470  D$[49]="PHOTON TUBESDAMAGE CNTRL"
480  E$="SHIELD CNTRLCOMPUTER"
490  B9=K9=0
500  FOR I=1 TO 8
510  FOR J=1 TO 8
520  K1=RND(1)
530  IF K1>.98 THEN 580
540  IF K1>.95 THEN 610
550  IF K1>.8 THEN 640
560  K3=0
570  GOTO 660
580  K3=3
590  K9=K9+3
600  GOTO 660
610  K3=2
620  K9=K9+2
630  GOTO 660
640  K3=1
650  K9=K9+1
660  K1=RND(1)
670  IF K1>.96 THEN 700
680 B3=0
690  GOTO 720
700  B3=1
710  B9=B9+1
720  S3=INT(RND(1)*8+1)
730  G[I,J]=K3*100+B3*10+S3
740  Z[I,J]=0
750  NEXT J
760  NEXT I
770  K7=K9
775  IF B9 <= 0 OR K9 <= 0 THEN 490
                                                                  STAR BASES"
780  PRINT "YOU MUST DESTROY"K9;" KLINGONS IN"T9;" STARDATES WITH"B9;" ST
810  K3=B3=S3=0
820  IF Q1<1 OR Q1>8 OR Q2<1 OR Q2>8 THEN 920
830  X=G[Q1,Q2]*.01
840  K3=INT(X)
850  B3=INT((X-K3)*10)
860  S3=G[Q1,Q2]-INT(G[Q1,Q2]*.1)*10
870  IF K3=0 THEN 910
880  IF S>200 THEN 910
890  PRINT "COMBAT AREA      CONDITION RED"
900  PRINT "   SHIELDS DANGEROUSLY LOW"
910  MAT K=ZER
920  FOR I=1 TO 3
930  K[I,3]=0
940  NEXT I
950  Q$=Z$
960  R$=Z$
970  S$=Z$[1,48]
980  A$="<*>"
990  Z1=S1
1000  Z2=S2
1010  GOSUB 5510
1020  FOR I=1 TO K3
1030  GOSUB 5380
1040  A$="+++"
1050  Z1=R1
1060  Z2=R2
1070  GOSUB 5510
1080  K[I,1]=R1
1090  K[I,2]=R2
1100  K[I,3]=S9
1110  NEXT I
1120  FOR I=1 TO B3
1130  GOSUB 5380
1140  A$=">!<"
1150  Z1=R1
1160  Z2=R2
1170  GOSUB 5510
1180  NEXT I
1190  FOR I=1 TO S3
1200  GOSUB 5380
1210  A$=" * "
1220  Z1=R1
1230  Z2=R2
1240  GOSUB 5510
1250  NEXT I
1260  GOSUB 4120
1270  PRINT "COMMAND:";
1280  INPUT A
```

The Trifid Nebula

Messier 92

Messier 87

```
1290 GOTO A+1 OF 1410,1260,2330,2530,2800,3460,3560,4630
1300  PRINT
1310  PRINT "    0 = SET COURSE"
1320  PRINT "    1 = SHORT RANGE SENSOR SCAN"
1330  PRINT "    2 = LONG RANGE SENSOR SCAN"
1340  PRINT "    3 = FIRE PHASERS"
1350  PRINT "    4 = FIRE PHOTON TORPEDOES"
1360  PRINT "    5 = SHIELD CONTROL"
1370  PRINT "    6 = DAMAGE CONTROL REPORT"
1380  PRINT "    7 = CALL ON LIBRARY COMPUTER"
1390  PRINT
1400  GOTO 1270
1410  PRINT "COURSE (1-9):";
1420  INPUT C1
1430  IF C1=0 THEN 1270
1440  IF C1<1 OR C1 >= 9 THEN 1410
1450  PRINT "WARP FACTOR (0-8):";
1460  INPUT W1
1470  IF W1<0 OR W1>8 THEN 1410
1480  IF D[1] >= 0 OR W1 <= .2 THEN 1510
1490  PRINT "WARP ENGINES ARE DAMAGED, MAXIMUM SPEED = WARP .2"
1500  GOTO 1410
1510  IF K3 <= 0 THEN 1560
1520  GOSUB 3790
1530  IF K3 <= 0 THEN 1560
1540  IF S<0 THEN 4000
1550  GOTO 1610
1560  IF E>0 THEN 1610
1570  IF S<1 THEN 3920
                                                                    LEFT"
1580  PRINT "YOU HAVE"E" UNITS OF ENERGY"
1590  PRINT "SUGGEST YOU GET SOME FROM YOUR SHIELDS WHICH HAVE"S" UNITS LE
1600  GOTO 1270
1610  FOR I=1 TO 8
1620  IF D[I] >= 0 THEN 1640
1630  D[I]=D[I]+1
1640  NEXT I
1650  IF RND(1)>.2 THEN 1810
1660  R1=INT(RND(1)*8+1)
1670  IF RND(1) >= .5 THEN 1750
1680  D[R1]=D[R1]-(RND(1)*5+1)
1690  PRINT
1700  PRINT "DAMAGE CONTROL REPORT:";
1710  GOSUB 5610
1720  PRINT " DAMAGED"
1730  PRINT
1740  GOTO 1810
1750  D[R1]=D[R1]+(RND(1)*5+1)
1760  PRINT
1770  PRINT "DAMAGE CONTROL REPORT:";
1780  GOSUB 5610
1790  PRINT " STATE OF REPAIR IMPROVED"
1800  PRINT
1810  N=INT(W1*8)
1820  A$="   "
1830  Z1=S1
1840  Z2=S2
1850  GOSUB 5510
1870  X=S1
1880  Y=S2
1885  C2=INT(C1)
1890  X1=C[C2,1]+(C[C2+1,1]-C[C2,1])*(C1-C2)
1900  X2=C[C2,2]+(C[C2+1,2]-C[C2,2])*(C1-C2)
1910  FOR I=1 TO N
1920  S1=S1+X1
1930  S2=S2+X2
1940  IF S1<.5 OR S1 >= 8.5 OR S2<.5 OR S2 >= 8.5 THEN 2170
1950  A$="   "
1960  Z1=S1
1970  Z2=S2
1980  GOSUB 5680
1990  IF Z3 <> 0 THEN 2070
2030  PRINT  USING 5370;S1,S2
2040  S1=S1-X1
2050  S2=S2-X2
2060  GOTO 2080
2070  NEXT I
2080  A$="<*>"
2083  S1=INT(S1+.5)
2086  S2=INT(S2+.5)
2090  Z1=S1
2100  Z2=S2
2110  GOSUB 5510
2120  E=E-N+5
2130  IF W1<1 THEN 2150
2140  T=T+1
2150  IF T>T0+T9 THEN 3970
2160  GOTO 1260
2170  X=Q1*8+X+X1*N
2180  Y=Q2*8+Y+X2*N
2190  Q1=INT(X/8)
2200  Q2=INT(Y/8)
2210  S1=INT(X-Q1*8+.5)
2220  S2=INT(Y-Q2*8+.5)
2230  IF S1 <> 0 THEN 2260
2240  Q1=Q1-1
2250  S1=8
2260  IF S2 <> 0 THEN 2290
2270  Q2=Q2-1
2280  S2=8
2290  T=T+1
2300  E=E-N+5
2310  IF T>T0+T9 THEN 3970
2320  GOTO 810
2330  IF D[3] >= 0 THEN 2370
2340  PRINT "LONG RANGE SENSORS ARE INOPERABLE"
2350  IMAGE "LONG RANGE SENSOR SCAN FOR QUADRANT ",D,",",D
2360  GOTO 1270
2370  PRINT  USING 2350;Q1,Q2
2380  PRINT  USING 2520
2390  FOR I=Q1-1 TO Q1+1
2400  MAT N=ZER
2410  FOR J=Q2-1 TO Q2+1
2420  IF I<1 OR I>8 OR J<1 OR J>8 THEN 2460
2430  N[J-Q2+2]=G[I,J]
2440  IF D[7]<0 THEN 2460
2450  Z[I,J]=G[I,J]
2460  NEXT J
2470  PRINT  USING 2510;N[1],N[2],N[3]
2480  PRINT  USING 2520
2490  NEXT I
2500  GOTO 1270
2510  IMAGE ": ",3(3D," :")
2520  IMAGE "-----------------"
2530  IF K3 <= 0 THEN 3670
2540  IF D[4] >= 0 THEN 2570
2550  PRINT "PHASER CONTROL IS DISABLED"
2560  GOTO 1270
```

Crab Nebula

The Omega Nebula

continued

The nebulous cluster Messier 16 in Serpens.

The Network Nebula

The California Nebula

The Ring Nebula

```
2570  IF D[7] >= 0 THEN 2590
2580  PRINT " COMPUTER FAILURE HAMPERS ACCURACY"
2590  PRINT "PHASERS LOCKED ON TARGET.  ENERGY AVAILABLE="E
2600  PRINT "NUMBER OF UNITS TO FIRE:";
2610  INPUT X
2620  IF X <= 0 THEN 1270
2630  IF E-X<0 THEN 2570
2640  E=E-X
2650  GOSUB 3790
2660  IF D[7] >= 0 THEN 2680
2670  X=X*RND(1)
2680  FOR I=1 TO 3
2690  IF K[I,3] <= 0 THEN 2770
2700  H=(X/K3/FND(0))*(2*RND(1))
2710  K[I,3]=K[I,3]-H
2720  PRINT  USING 2730;H,K[I,1],K[I,2],K[I,3]
2730  IMAGE 4D," UNIT HIT ON KLINGON AT SECTOR ",D,",",D,"   (",3D," LEFT)"
2740  IF K[I,3]>0 THEN 2770
2750  GOSUB 3690
2760  IF K9 <= 0 THEN 4040
2770  NEXT I
2780  IF E<0 THEN 4000
2790  GOTO 1270
2800  IF D[5] >= 0 THEN 2830
2810  PRINT "PHOTON TUBES ARE NOT OPERATIONAL"
2820  GOTO 1270
2830  IF P>0 THEN 2860
2840  PRINT "ALL PHOTON TORPEDOES EXPENDED"
2850  GOTO 1270
2860  PRINT "TORPEDO COURSE (1-9):";
2870  INPUT C1
2880  IF C1=0 THEN 1270
2890  IF C1<1 OR C1 >= 9 THEN 2860
2895  C2=INT(C1)
2900  X1=C[C2,1]+(C[C2+1,1]-C[C2,1])*(C1-C2)
2910  X2=C[C2,2]+(C[C2+1,2]-C[C2,2])*(C1-C2)
2920  X=S1
2930  Y=S2
2940  P=P-1
2950  PRINT "TORPEDO TRACK:"
2960  X=X+X1
2970  Y=Y+X2
2980  IF X<.5 OR X >= 8.5 OR Y<.5 OR Y >= 8.5 THEN 3420
2990  PRINT  USING 3000;X,Y
3000  IMAGE 15X,D,",",D
3010  A$="   "
3020  Z1=X
3030  Z2=Y
3040  GOSUB 5680
3050  IF Z3=0 THEN 3070
3060  GOTO 2960
3070  A$="+++"
3080  Z1=X
3090  Z2=Y
3100  GOSUB 5680
3110  IF Z3=0 THEN 3220
3120  PRINT "*** KLINGON DESTROYED ***"
3130  K3=K3-1
3140  K9=K9-1
3150  IF K9 <= 0 THEN 4040
3160  FOR I=1 TO 3
3170  IF INT(X+.5) <> K[I,1] THEN 3190
3180  IF INT(Y+.5)=K[I,2] THEN 3200
3190  NEXT I
3200  K[I,3]=0
3210  GOTO 3360
3220  A$=" * "
3230  Z1=X
3240  Z2=Y
3250  GOSUB 5680
3260  IF Z3=0 THEN 3290
3270  PRINT "YOU CAN'T DESTROY STARS SILLY"
3280  GOTO 3420
3290  A$=">!<"
3300  Z1=X
3310  Z2=Y
3320  GOSUB 5680
3330  IF Z3=0 THEN 2960
3340  PRINT "*** STAR BASE DESTROYED ***  .......CONGRATULATIONS"
3350  B3=B3-1
3360  A$="   "
3370  Z1=INT(X+.5)
3380  Z2=INT(Y+.5)
3390  GOSUB 5510
3400  G[Q1,Q2]=K3*100+B3*10+S3
3410  GOTO 3430
3420  PRINT "TORPEDO MISSED"
3430  GOSUB 3790
3440  IF E<0 THEN 4000
3450  GOTO 1270
3460  IF D[7] >= 0 THEN 3490
3470  PRINT "SHIELD CONTROL IS NON-OPERATIONAL"
3480  GOTO 1270
3490  PRINT "ENERGY AVAILABLE ="E+S"   NUMBER OF UNITS TO SHIELDS:";
3500  INPUT X
3510  IF X <= 0 THEN 1270
3520  IF E+S-X<0 THEN 3490
3530  E=E+S-X
3540  S=X
3550  GOTO 1270
3560  IF D[6] >= 0 THEN 3590
3570  PRINT "DAMAGE CONTROL REPORT IS NOT AVAILABLE"
3580  GOTO 1270
3590  PRINT
3600  PRINT "DEVICE          STATE OF REPAIR"
3610  FOR R1=1 TO 8
3620  GOSUB 5610
3630  PRINT "",D[R1]
3640  NEXT R1
3650  PRINT
3660  GOTO 1270
3670  PRINT "SHORT RANGE SENSORS REPORT NO KLINGONS IN THIS QUANDRANT"
3680  GOTO 1270
3690  PRINT  USING 3700;K[I,1],K[I,2]
3700  IMAGE"KLINGON AT SECTOR ",D,",",D," DESTROYED ****"
3710  K3=K3-1
3720  K9=K9-1
3730  A$="   "
3740  Z1=K[I,1]
3750  Z2=K[I,2]
3760  GOSUB 5510
3770  G[Q1,Q2]=K3*100+B3*10+S3
3780  RETURN
3790  IF C$ <> "DOCKED" THEN 3820
3800  PRINT "STAR BASE SHIELDS PROTECT THE ENTERPRISE"
3810  RETURN
```

```
3820  IF K3 <= 0 THEN 3910
3830  FOR I=1 TO 3
3840  IF K[I,3] <= 0 THEN 3900
3850  H=(K[I,3]/FND(0))*(2*RND(1))
3860  S=S-H
3870  PRINT  USING 3880;H,K[I,1],K[I,2],S
3880  IMAGE 4D," UNIT HIT ON ENTERPRISE AT SECTOR ",D,",",D,"   (",4D," LE
3890  IF S<0 THEN 4000
3900  NEXT I
3910  RETURN
3920  PRINT "THE ENTERPRISE IS DEAD IN SPACE. IF YOU SURVIVE ALL IMPENDING"
3930  PRINT "ATTACK YOU WILL BE DEMOTED TO THE RANK OF PRIVATE"
3940  IF K3 <= 0 THEN 4020
3950  GOSUB 3790
3960  GOTO 3940
3970  PRINT
3980  PRINT "IT IS STARDATE"T
3990  GOTO 4020
4000  PRINT
4010  PRINT "THE ENTERPRISE HAS BEEN DESTROYED. THE FEDERATION WILL BE CO
4020  PRINT "THERE ARE STILL"K9" KLINGON BATTLE CRUISERS"
4030  GOTO 230
4040  PRINT
4050  PRINT "THE LAST KLIGON BATTLE CRUISER IN THE GALAXY HAS BEEN DESTRO
4060  PRINT "THE FEDERATION HAS BEEN SAVED !!!"
4070  PRINT
4080  PRINT "YOUR EFFICIENCY RATING ="((K7/(T-T0))*1000)
4092  T1=TIM(0)+TIM(1)*60
4100  PRINT "YOUR ACTUAL TIME OF MISSION ="INT((((T1-T7)*.4)-T7)*100)" MI
4110  GOTO 230
4120  FOR I=S1-1 TO S1+1
4130  FOR J=S2-1 TO S2+1
4140  IF I<1 OR I>8 OR J<1 OR J>8 THEN 4200
4150  A$=">!<"
4160  Z1=I
4170  Z2=J
4180  GOSUB 5680
4190  IF Z3=1 THEN 4240
4200  NEXT J
4210  NEXT I
4220  D0=0
4230  GOTO 4310
4240  D0=1
4250  C$="DOCKED"
4260  E=3000
4270  P=10
4280  PRINT "SHIELDS DROPPED FOR DOCKING PURPOSES"
4290  S=0
4300  GOTO 4380
4310  IF K3>0 THEN 4350
4320  IF E<E0*.1 THEN 4370
4330  C$="GREEN"
4340  GOTO 4380
4350  C$="RED"
4360  GOTO 4380
4370  C$="YELLOW"
4380  IF D[2] >= 0 THEN 4430
4390  PRINT
4400  PRINT "*** SHORT RANGE SENSORS ARE OUT ***"
4410  PRINT
4420  GOTO 4530
4430  PRINT  USING 4540
4440  PRINT  USING 4550:Q$[1,3],Q$[4,6],Q$[7,9],Q$[10,12],
                       Q$[13,15],Q$[16,18],Q$[19,21],Q$[22,24]
4450  PRINT  USING 4560:Q$[25,27],Q$[28,30],Q$[31,33],Q$[34,36],
                       Q$[37,39],Q$[40,42],Q$[43,45],Q$[46,48],T
4460  PRINT  USING 4570:Q$[49,51],Q$[52,54],Q$[55,57],Q$[58,60],
                       Q$[61,63],Q$[64,66],Q$[67,69],Q$[70,72],C$
4470  PRINT  USING 4580:R$[1,3],R$[4,6],R$[7,9],R$[10,12],R$[13,15],
                       R$[16,18],R$[19,21],R$[22,24],Q1,Q2
4480  PRINT  USING 4590:R$[25,27],R$[28,30],R$[31,33],R$[34,36],
                       R$[37,39],R$[40,42],R$[43,45],R$[46,48],S2,S2
4490  PRINT  USING 4600:R$[49,51],R$[52,54],R$[55,57],R$[58,60],
                       R$[61,63],R$[64,66],R$[67,69],R$[70,72],E
4500  PRINT  USING 4610:S$[1,3],S$[4,6],S$[7,9],S$[10,12],
                       S$[13,15],S$[16,18],S$[19,21],S$[22,24],P
4510  PRINT  USING 4620:S$[25,27],S$[28,30],S$[31,33],S$[34,36],
                       S$[37,39],S$[40,42],S$[43,45],S$[46,48],S
4520  PRINT  USING 4540
4530  RETURN
4540  IMAGE"---------------------------------"
4550  IMAGE 8(X,3A)
4560  IMAGE 8(X,3A),8X,"STARDATE",8X,5D
4570  IMAGE 8(X,3A),8X,"CONDITION",8X,6A
4580  IMAGE 8(X,3A),8X,"QUADRANT",9X,D,",",D
4590  IMAGE 8(X,3A),8X,"SECTOR",11X,D,",",D
4600  IMAGE 8(X,3A),8X,"ENERGY",9X,6D
4610  IMAGE 8(X,3A),8X,"PHOTON TORPEDOES",3D
4620  IMAGE 8(X,3A),8X,"SHIELDS",8X,6D
4630  IF D[8] >= 0 THEN 4660
4640  PRINT "COMPUTER DISABLED"
4650  GOTO 1270
4660  PRINT "COMPUTER ACTIVE AND AWAITING COMMAND";
4670  INPUT A
4680  GOTO A+1 OF 4740,4830,4880
4690  PRINT "FUNCTIONS AVAILABLE FROM COMPUTER"
4700  PRINT "   0 = CUMULATIVE GALATIC RECORD"
4710  PRINT "   1 = STATUS REPORT"
4720  PRINT "   2 = PHOTON TORPEDO DATA"
4730  GOTO 4660
4740  PRINT  USING 4750;Q1,Q2
4750  IMAGE"COMPUTER RECORD OF GALAXY FOR QUADRANT ",D,",",D
4760  PRINT  USING 5330
4770  PRINT  USING 5360
4780  FOR I=1 TO 8
4790  PRINT  USING 5350;I,Z[I,1],Z[I,2],Z[I,3],Z[I,4],Z[I,5],Z[I,6],Z[I,7
4800  PRINT  USING 5360
4810  NEXT I
4820  GOTO 1270
4830  PRINT "   STATUS REPORT"
4840  PRINT "NUMBER OF KLINGONS LEFT ="K9
4850  PRINT "NUMBER OF STARDATES LEFT ="(T0+T9)-T
4860  PRINT "NUMBER OF STARBASES LEFT ="B9
4870  GOTO 3560
4880  PRINT
4890  H8=0
4900  FOR I=1 TO 3
4910  IF K[I,3] <= 0 THEN 5260
4920  C1=S1
4930  A=S2
4940  W1=K[I,1]
4950  X=K[I,2]
4960  GOTO 5010
```

LEFT)"

CONQUERED"

DESTROYED"

MINUTES"

THESE MUST ACTUALLY BE ONE LINE - WE SHOW TWO LINES FOR READING CONVENIENCE ONLY

Z(1,7], Z[1,8]

continued

```
4970  PRINT  USING 4980;Q1,Q2,S1,S2
4980  IMAGE"YOU ARE AT QUADRANT ( ",D,",",D," )  SECTOR ( ",D,",",D," )"
4990  PRINT "SHIP'S & TARGET'S COORDINATES ARE";
5000  INPUT C1,A,W1,X
5010  X=X-A
5020  A=C1-W1
5030  IF X<0 THEN 5130
5040  IF A<0 THEN 5190
5050  IF X>0 THEN 5070
5060  IF A=0 THEN 5150
5070  C1=1
5080  IF ABS(A) <= ABS(X) THEN 5110
5090  PRINT "DIRECTION ="C1+(((ABS(A)-ABS(X))+ABS(A))/ABS(A))
5100  GOTO 5240
5110  PRINT "DIRECTION ="C1+(ABS(A)/ABS(X))
5120  GOTO 5240
5130  IF A>0 THEN 5170
5140  IF X=0 THEN 5190
5150  C1=5
5160  GOTO 5080
5170  C1=3
5180  GOTO 5200
5190  C1=7
5200  IF ABS(A) >= ABS(X) THEN 5230
5210  PRINT "DIRECTION ="C1+(((ABS(X)-ABS(A))+ABS(X))/ABS(X))
5220  GOTO 5240
5230  PRINT "DIRECTION ="C1+(ABS(X)/ABS(A))
5240  PRINT "DISTANCE ="(SQR(X↑2+A↑2))
5250  IF H8=1 THEN 5320
5260  NEXT I
5270  H8=0
5280  PRINT "DO YOU WANT TO USE THE CALCULATOR";
5290  INPUT A$
5300  IF A$="YES" THEN 4970
5310  IF A$ <> "NO" THEN 5280
5320  GOTO 1270
5330  IMAGE"     1     2     3     4     5     6     7     8"
5340  IMAGE"-------------------------------------------------"
5350  IMAGE D,8(3X,3D)
5360  IMAGE"   ----- ----- ----- ----- ----- ----- ----- -----"
5370  IMAGE" WARP ENGINES SHUTDOWN AT SECTOR ",D,",",D," DUE TO BAD NAVIG
5380  R1=INT(RND(1)*8+1)                                               ↗
5390  R2=INT(RND(1)*8+1)
5400  A$="   "                                                   NAVIGATION"
5410  Z1=R1
5420  Z2=R2
5430  GOSUB 5680
5440  IF Z3=0 THEN 5380
5450  RETURN
5460  FOR I=1 TO 11
5470  PRINT "";
5480  NEXT I
5490  PRINT
5500  RETURN
5510  REM ******  INSERTION IN STRING ARRAY FOR QUADRANT ******
5520  S8=Z1*24+Z2*3-26
5530  IF S8>72 THEN 5560
5540  Q$[S8,S8+2]=A$
5550  GOTO 5600
5560  IF S8>144 THEN 5590
5570  R$[S8-72,S8-70]=A$
5580  GOTO 5600
5590  S$[S8-144,S8-142]=A$
5600  RETURN
5610  REM ****  PRINTS DEVICE NAME FROM ARRAY *****
5620  S8=R1*12-11
5630  IF S8>72 THEN 5660
5640  PRINT D$[S8,S8+11];
5650  GOTO 5670
5660  PRINT E$[S8-72,S8-61];
5670  RETURN
5680  REM *******  STRING COMPARISON IN QUADRANT ARRAY **********
5683  Z1=INT(Z1+.5)
5686  Z2=INT(Z2+.5)
5690  S8=Z1*24+Z2*3-26
5700  Z3=0
5710  IF S8>72 THEN 5750
5720  IF Q$[S8,S8+2] <> A$ THEN 5810
5730  Z3=1
5740  GOTO 5810
5750  IF S8>144 THEN 5790
5760  IF R$[S8-72,S8-70] <> A$ THEN 5810
5770  Z3=1
5780  GOTO 5810
5790  IF S$[S8-144,S8-142] <> A$ THEN 5810
5800  Z3=1
5810  RETURN
5820  PRINT "     INSTRUCTIONS:"
5830  PRINT "<*> = ENTERPRISE"
5840  PRINT "+++ = KLINGON"
5850  PRINT ">!< = STARBASE"
5860  PRINT " *  = STAR"
5870  PRINT "COMMAND 0 = WARP ENGINE CONTROL"
5880  PRINT "  'COURSE IS IN A CIRCULAR NUMERICAL          4  3  2"
5890  PRINT "  VECTOR ARRANGEMENT AS SHOWN.                 \ ↑ /"
5900  PRINT "  INTERGER AND REAL VALUES MAY BE               \↑/"
5910  PRINT "  USED.  THEREFORE COURSE 1.5 IS            5 ------ 1"
5920  PRINT "  HALF WAY BETWEEN 1 AND 2.                     /↑\"
5930  PRINT "                                               / ↑ \"
5940  PRINT "  A VECTOR OF 9 IS UNDEFINED, BUT             6  7  8"
5950  PRINT "  VALUES MAY APPROACH 9."
5960  PRINT "                                              COURSE"
5970  PRINT "  ONE 'WARP FACTOR' IS THE SIZE OF"
5980  PRINT "  ONE QUADRANT.  THEREFORE TO GET"
5990  PRINT "  FROM QUADRANT 6,5 TO 5,5 YOU WOULD"
6000  PRINT "  USE COURSE 3, WARP FACTOR 1"
6010  PRINT "COMMAND 1 = SHORT RANGE SENSOR SCAN"
6020  PRINT "  PRINTS THE QUADRANT YOU ARE CURRENTLY IN, INCLUDING"
6030  PRINT "  STARS, KLINGONS, STARBASES, AND THE ENTERPRISE; ALONG"
6040  PRINT "  WITH OTHER PERTINATE INFORMATION."
6050  PRINT "COMMAND 2 = LONG RANGE SENSOR SCAN"
6060  PRINT "  SHOWS CONDITIONS IN SPACE FOR ONE QUADRANT ON EACH SIDE"
6070  PRINT "  OF THE ENTERPRISE IN THE MIDDLE OF THE SCAN.  THE SCAN"
6080  PRINT "  IS CODED IN THE FORM XXX, WHERE THE UNITS DIGIT IS THE"
6090  PRINT "  NUMBER OF STARS, THE TENS DIGIT IS THE NUMBER OF STAR-"
6100  PRINT "  BASES, THE HUNDREDS DIGIT IS THE NUMBER OF KLINGONS."
6110  PRINT "COMMAND 3 = PHASER CONTROL"
6120  PRINT "  ALLOWS YOU TO DESTROY THE KLINGONS BY HITTING HIM WITH"
6130  PRINT "  SUITABLY LARGE NUMBERS OF ENERGY UNITS TO DEPLETE HIS "
6140  PRINT "  SHIELD POWER.  KEEP IN MIND THAT WHEN YOU SHOOT AT"
6150  PRINT "  HIM, HE GONNA DO IT TO YOU TOO."
6160  PRINT "COMMAND 4 = PHOTON TORPEDO CONTROL"
6170  PRINT "  COURSE IS THE SAME AS USED IN WARP ENGINE CONTROL"
6180  PRINT "  IF YOU HIT THE KLINGON, HE IS DESTROYED AND CANNOT FIRE"
6190  PRINT "  BACK AT YOU.  IF YOU MISS, HE WILL SHOOT HIS PHASERS AT"
6200  PRINT "  YOU."
6210  PRINT "   NOTE: THE LIBRARY COMPUTER (COMMAND 7) HAS AN OPTION"
6220  PRINT "   TO COMPUTE TORPEDO TRAJECTORY FOR YOU (OPTION 2)."
6230  PRINT "COMMAND 5 = SHIELD CONTROL"
6240  PRINT "  DEFINES NUMBER OF ENERGY UNITS TO BE ASSIGNED TO SHIELDS"
6250  PRINT "  ENERGY IS TAKEN FROM TOTAL SHIP'S ENERGY."
6260  PRINT "COMMAND 6 = DAMAGE CONTROL REPORT"
6270  PRINT "  GIVES STATE OF REPAIRS OF ALL DEVICES.  A STATE OF REPAIR"
6280  PRINT "  LESS THAN ZERO SHOWS THAT THAT DEVICE IS TEMPORARALY"
6290  PRINT "  DAMAGED."
6300  PRINT "COMMAND 7 = LIBRARY COMPUTER"
6310  PRINT "  THE LIBRARY COMPUTER CONTAINS THREE OPTIONS:"
6320  PRINT "    OPTION 0 = CUMULATIVE GALACTIC RECORD"
6330  PRINT "     SHOWS COMPUTER MEMORY OF THE RESULTS OF ALL PREVIOUS"
6340  PRINT "     LONG RANGE SENSOR SCANS"
6350  PRINT "    OPTION 1 = STATUS REPORT"
6360  PRINT "     SHOWS NUMBER OF KLINGONS, STARDATESC AND STARBASES"
6370  PRINT "     LEFT."
6380  PRINT "    OPTION 2 = PHOTON TORPEDO DATA"
6390  PRINT "     GIVES TRAJECTORY AND DISTANCE BETWEEN THE ENTERPRISE"
6400  PRINT "     AND ALL KLINGONS IN YOUR QUADRANT"
6410  RETURN
6420  END
```

STAR TREK CAT.

On September 8, 1976, it will be 10 years since STAR TREK was first viewed by the public on NBC. Today, 10 years later, STAR TREK is bigger and stronger than ever, thanks to your loyal support. To answer your most frequently asked question: YES — There will be a big budget STAR TREK feature motion picture. The working title is STAR TREK II" and yes, all of the original cast have expressed their desire to recreate their original roles. Gene Roddenberry will again produce his classic creation. This movie is a reality because of your enthusiastic efforts to bring back STAR TREK. Paramount has heard you loud and clear!

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TREK '73

After warming-up on STTR1, try TREK '73. You captain the Enterprise. The computer controls one or more (you choose how many) alien aggressors (Romulans, Centaurians, Klingons, etc.). TREK '73 is a quasi real-time game, even on a Teletype. Well, almost real-time. Each move represents 2 seconds of battle time. You get 8 seconds to make your move – be prepared to think fast! For info, write to:

William K. Char
370 – 31st Avenue
San Francisco, Ca. 94121

NEWSLETTER

I'm a high school senior and we timeshare an HP 2000C. Our system has quite a few games, especially of the Star Trek/space game variety. I've been thinking of starting a newsletter for space games and Star Treks, to be called M-5 (hopefully no Trekkies have used that one yet). M-5 would contain lists of games, and also ideas for games which haven't been implemented yet. As Bob Albrecht can probably testify, getting something like this off the ground is pretty difficult. As far as I can see, there are two big problems:

* Material. For the first issue I thought I'd run information on TREK 73, also some games we have on our system. I'll have whatever info I can get on TREK 75 and STAR 75. Other possibilities are a version of LUNAR which has an angle-of-thrust parameter in it, or maybe one with some kind of pictorial output for TTY. Also under consideration are articles on very, very expensive games, a free form input for any game, and an idea for a game called SPACER by John McClenny.

* Money to get it going: my already-strained capital reserves are being emptied by my TVT project, so I'm looking for another person who would be interested in co-editing M-5 and helping to defray the cost of getting it running.

That's about it – I'll keep you posted on M-5 and let you know if it ever gets printed.

Steve North
7 Deerhaven Lane
Newfoundland, NJ 07435

PAPER TAPE <> STTR1

Does the thought of typing STTR1 into your computer make your fingers tremble? Relax, help is available. Buy a paper tape of STTR1 from:

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MOTIE

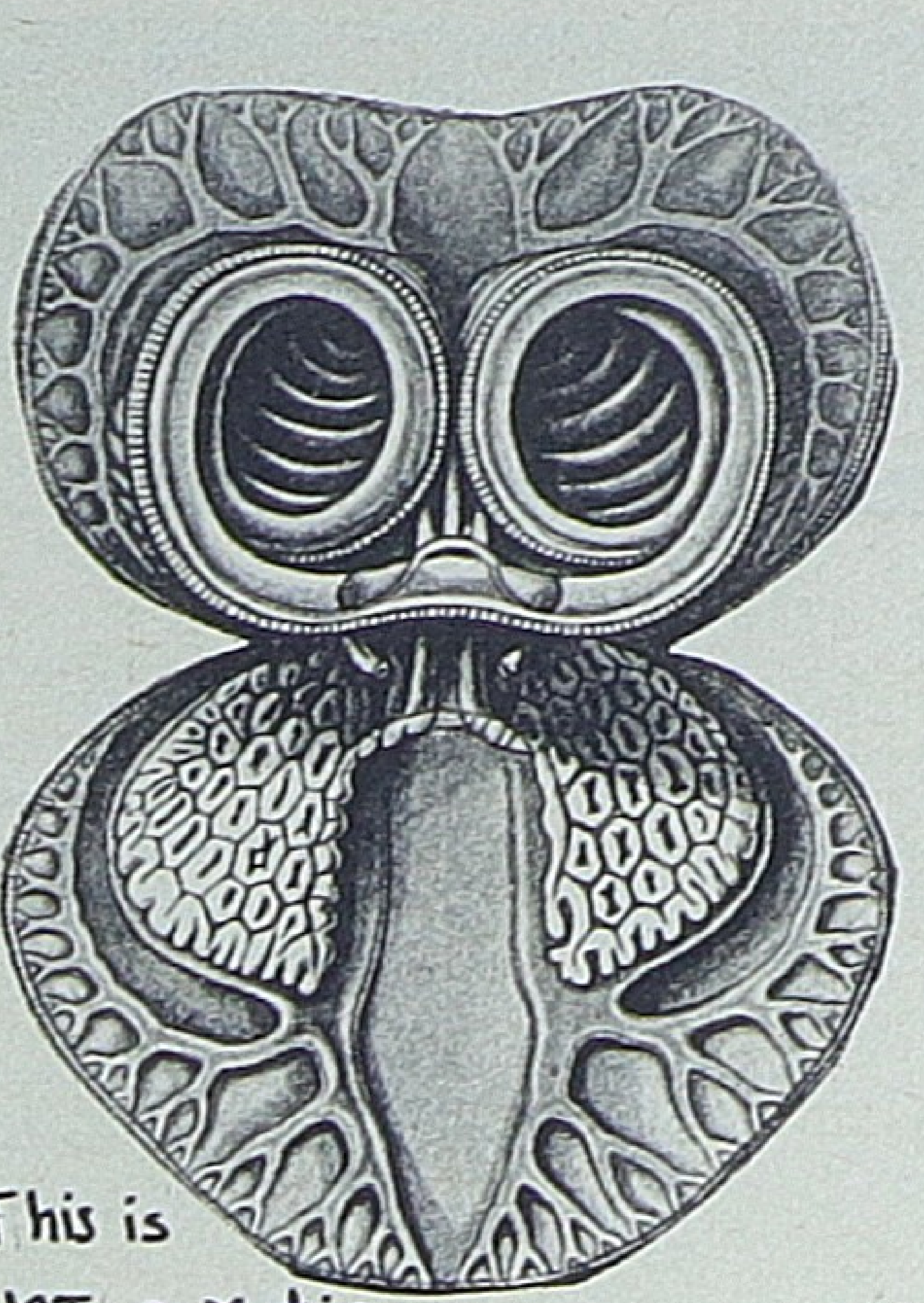
by *Mac Oglesby*

20

The scenario for this game was adapted from the novel *A Mote In God's Eye* by L. Niven and J. Pournelle. The game itself is an adaptation of "The Soldier's Game" described in detail in *The Master Book of Mathematical Recreations* by F. Schuh (Dover). The program is written in Dartmouth BASIC.

```
100 ' NAME:  ELEMLIB***:MOTIE
110 '
120 ' BY:  MAC OGLESBY IN JUNE 1975.
130 '
140 ' DESCRIPTION:  THE MOTIES ARE NON-HUMANS POSSESSING INCREDIBLE
150 '   TECHNOLOGICAL BRILLIANCE.  THEY BREED AS RAPIDLY AS BACTERIA
160 '   AND DESPERATELY NEED MORE ROOM.  IF THEY ELUDE THE GUARDIAN
170 '   STARSHIPS PROTECTING THE ONLY GATEWAY BETWEEN THE MOTIE WORLD
180 '   AND THE HUMAN EMPIRE, HUMANKIND WILL BE ENSLAVED, IF NOT
190 '   EXTERMINATED.
200 '
210 ' INSTRUCTIONS:  TYPE "RUN" FOR COMPLETE INSTRUCTIONS.
220 '
230 ' REMARKS:  THE SCENARIO FOR THIS GAME WAS ADAPTED FROM THE NOVEL
240 '   "A MOTE IN GOD'S EYE" BY L. NIVEN AND J. POURNELLE.
250 '   THE GAME ITSELF IS AN ADAPTATION OF "THE SOLDIER'S GAME"
260 '   DESCRIBED IN DETAIL IN "THE MASTER BOOK OF MATHEMATICAL
270 '   RECREATIONS" BY F. SCHUH (DOVER).
280 '
290 '
300 '
310 DIM C$(15)                          'SAVE ROOM FOR 15 TURNS
320 RANDOMIZE
330 FOR J=0 TO 10
340    READ C(J)                        '# OF LEGAL GUARDIAN MOVES FROM J
350 NEXT J
360    DATA 3,3,3,3,2,5,2,2,3,2,0
370 FOR J=0 TO 10
380    READ F(J)                        '# OF LEGAL MOTIE MOVES FROM J
390 NEXT J
400    DATA 3,4,4,4,3,8,3,4,4,4,3
410 FOR J=0 TO 10
420    FOR K=1 TO C(J)
430       READ D(J,K)                   'LOCATIONS GUARDIAN CAN GO TO FROM J
440    NEXT K
450 NEXT J
460    DATA 1,2,3,  2,4,5,  1,3,5,  2,5,6,  5,7,  4,6,7,8,9,  5,9
470    DATA 8,10,  7,9,10,  8,10,  NONE
480 FOR J=0 TO 10
490    FOR K=1 TO F(J)
500       READ G(J,K)                   'LOCATIONS MOTIE CAN GO TO FROM J
510    NEXT K
520 NEXT J
530    DATA 1,2,3,  0,2,4,5,  0,1,3,5,  0,2,5,6,  1,5,7,  1,2,3,4,6,7,8,9
540    DATA 3,5,9,  4,5,8,10,  5,7,9,10,  5,6,8,10,  7,8,9
550 FOR J=0 TO 10
560    LET B$(J)=STR$(J)                'B$() STORES DISPLAY STRINGS
570 NEXT J
580
590 PRINT "WANT INSTRUCTIONS FOR MOTIE";
600 LINPUT I$
610 IF SEG$(I$,1,1)<>"Y" THEN 640
620    GOSUB 2870                       'GO PRINT INSTRUCTIONS
630    GOTO 660
640 GOSUB 2520                          'SHOW HOW BOARD IS NUMBERED
650
660 PRINT "HOW MANY PLAYERS (1 OR 2)";  'REPLAY RETURNS TO HERE
670 INPUT P
680 IF P=1 THEN 780                     'COMPUTER LOCATES MOTIE
690    IF P=2 THEN 710
700       GOTO 660
710    PRINT "WHERE IS THE MOTIE VESSEL FIRST DETECTED";
720    INPUT G                          'G IS MOTIE LOCATION
730    IF (10-G)*(G-2)<0 THEN 760       'MOTIE STARTS AT 2-10 (BUT NOT 3)
740       IF G=3 THEN 760
750          GOTO 830
760    PRINT "CHOOSE LOCATION 2-10 (BUT NOT 3)."
770    GOTO 710
780 LET G=2+INT(RND*9)
790 IF G<>3 THEN 810
800    GOTO 780
810 PRINT "OK, I'LL MOVE THE MOTIE VESSEL, FIRST DETECTED AT";G
820
830 LET B$(0)="*"                       'PLACE PIECES ON THE BOARD
840 LET B$(1)="*"
850 LET B$(3)="*"
860 LET B$(G)="&"
870 GOSUB 2680                          'RECORD INITIAL POSITIONS
880 PRINT
890 PRINT "* = GUARDIANS   & = MOTIE"
900 GOSUB 2740                          'PRINT DISPLAY
910
920 PRINT "   GUARDIAN (*) MOVE";
930 LINPUT G$
940 LET G1$=SEG$(G$,1,1)
950 IF G1$="S" THEN 1030
960    IF G1$="R" THEN 1010
970       IF G1$="H" THEN 990
980          GOTO 1050                  'CONTINUE
990       GOSUB 3090                    'PRINT PART OF INSTRUCTIONS
1000        GOTO 920
1010   PRINT "THE GUARDIANS HAVE GIVEN UP!!"
1020   GOTO 2210
1030 PRINT "PROGRAM HALTED"
1040 STOP
1050 IF LEN(G$)>10 THEN 1290
1060    LET Z1=0                        'ROUTINE TO DROP COMMAS, ETC.
1070    CHANGE G$ TO Z
1080    FOR J=1 TO Z(0)
1090       IF (ASC(9)-Z(J))*(Z(J)-ASC(0))<0 THEN 1120
1100          LET Z1=Z1+1
1110          LET Z(Z1)=Z(J)
1120    NEXT J
1130    LET Z(0)=Z1
1140    CHANGE Z TO G$
1150    IF (3-LEN(G$))*(LEN(G$)-2)<>0 THEN 1290
1160       IF LEN(G$)=2 THEN 1210
1170          LET G1=VAL(SEG$(G$,2,3))
1180          IF G1<>10 THEN 1200
1190             GOTO 1220
1200          GOTO 1290
1210       LET G1=VAL(SEG$(G$,2,2))
1220       LET G0=VAL(SEG$(G$,1,1))
1230       IF B$(G0)<>"*" THEN 1290     'NO GUARDIAN AT B$(G0)
1240          IF STR$(G1)<>B$(G1) THEN 1290  'B$() IS OCCUPIED
1250             FOR K=1 TO C(G0)
1260                IF G1<>D(G0,K) THEN 1280
1270                   GOTO 1330        'LEGAL MOVE
1280             NEXT K
1290 PRINT "ILLEGAL MOVE.  INPUT IGNORED."
1300 PRINT "FOR INSTRUCTIONS, TYPE HELP AS YOUR MOVE."
1310 GOTO 920
1320
1330 LET T=T+1                          'INCREMENT TURN COUNTER
1340 LET B$(G1)="*"
1350 LET B$(G0)=STR$(G0)
1360 GOSUB 2680                         'RECORD POSITIONS
1370
1380 IF P=1 THEN 1780                   'LET COMPUTER MOVE MOTIE
1390    IF C$(T)="0*23&*6*8910" THEN 1430  'CHECK FOR GUARDIAN WIN
1400       IF C$(T)="012*4*&78*10" THEN 1430
1410          IF C$(T)="0123456***&" THEN 1430
1420             GOTO 1440              'CONTINUE
1430    GOTO 1850                       'GUARDIAN WIN
1440    PRINT "MOTIE (&) MOVE";
1450    LINPUT G$
1460    LET G1$=SEG$(G$,1,1)
1470    IF G1$="S" THEN 1550
1480       IF G1$="R" THEN 1530
1490          IF G1$="H" THEN 1510
1500             GOTO 1570              'CONTINUE
1510          GOSUB 3090                'PRINT PART OF INSTRUCTIONS
1520          GOTO 1440
1530       PRINT "THE MOTIE VESSEL GIVES UP!"
1540       GOTO 2390                    'REPLAY?
1550    PRINT$"PROGRAM HALTED"
1560    STOP
1570    IF LEN(G$)>10 THEN 1730
1580       CHANGE G$ TO Z
1590       IF Z(0)>2 THEN 1730          'TOO MUCH MOVE
1600          IF Z(0)=1 THEN 1660
1610             IF Z(1)<>49 THEN 1650
1620                IF Z(2)<>48 THEN 1650
1630                   LET G1=10
1640                   GOTO 1680
1650             GOTO 1730
1660          LET G1=Z(1)-48
1670          IF (9-G1)*G1<0 THEN 1730
1680             IF B$(G1)<>STR$(G1) THEN 1730
1690                FOR K=1 TO F(G)
1700                   IF G1<>G(G,K) THEN 1720
1710                      GOTO 2080     'LEGAL MOVE
1720                NEXT K
1730    PRINT "ILLEGAL MOVE.  INPUT IGNORED."
1740    PRINT "FOR INSTRUCTIONS, TYPE HELP AS YOUR MOVE."
1750    GOTO 1440
1760
1770    ' COMPUTER MOVES MOTIE
1780 LET T9=0                           'RESET COUNTER
1790 FOR K=1 TO F(G)
1800    IF B$(G(G,K))="*" THEN 1830     'GUARDIAN AT B$()
1810       LET T9=T9+1
1820       LET H(T9)=G(G,K)             'IDENTIFY MOTIE'S POSSIBLE MOVES
1830 NEXT K
1840 IF T9<>0 THEN 1880                 'MOTIE NOT TRAPPED
1850    PRINT "MOTIE VESSEL CANNOT MOVE!"
1860    PRINT "THE GUARDIANS HAVE SAVED THE HUMAN GALACTIC EMPIRE!"
1870    GOTO 2390                       'REPLAY?
1880 FOR K=1 TO T9
1890    LET G1=H(K)
1900    IF T9=1 THEN 2050               'NO CHOICE OF MOVES
1910       IF G1=4 THEN 2030            'MINIMAL STRATEGY SECTION AVOIDS
1920          IF G1=6 THEN 2000         'SOME OF THE OBVIOUS BLUNDERS
1930             IF G1<>8 THEN 1990
1940                IF C$(T)="0123**6&8*10" THEN 1980
1950                   IF C$(T)="01234***8&10" THEN 1980
1960                      IF C$(T)="01234***89&" THEN 1980
1970                         GOTO 2080
1980                GOTO 2060
1990             GOTO 2080
2000          IF C$(T)="012*4*67*&10" THEN 2020
2010             GOTO 2080
2020          GOTO 2060
2030       IF C$(T)<>"0*234*6&*910" THEN 2050
2040          GOTO 2060
2050    GOTO 2080
2060 NEXT K
2070
2080 LET B$(G1)="&"
2090 LET B$(G)=STR$(G)
2100 LET G=G1
2110 IF P=2 THEN 2130
2120    PRINT "MOTIE (&) GOES TO";G
2130 LET C$(T)=""                       'WIPE C$(T) CLEAN
2140 GOSUB 2680                         'RECORD POSITIONS AFTER TURN T
2150 GOSUB 2740                         'PRINT DISPLAY
2160
2170 ' ROUTINES TO CHECK FOR MOTIE WIN
2180 IF B$(0)<>"&" THEN 2230
2190    PRINT
2200    PRINT "THE MOTIE VESSEL HAS REACHED THE EMPIRE WORLDS!"
2210    PRINT "MAY ROCKEFORD PROTECT US!!"
2220    GOTO 2390
2230 IF T<15 THEN 2280
2240    PRINT
2250    PRINT "THE MOTIE VESSEL IS STILL LOOSE AFTER 15 MOVES!"
2260    PRINT "THE GUARDIANS HAVE FAILED!"
2270    GOTO 2390
2280 LET T9=0                           'RESET COUNTER
2290 FOR J=0 TO T-1
2300    IF C$(T)<>C$(J) THEN 2360
2310       LET T9=T9+1                  'COUNT MATCHES
2320       IF T9<2 THEN 2360
2330          PRINT
2340          PRINT "THAT'S 3 TIMES WE'VE SEEN THIS DISPLAY!"
2350          GOTO 2260
2360 NEXT J
2370 GOTO 920                           'GET NEXT GUARDIAN MOVE
2380
2390 PRINT
2400 PRINT "REPLAY";
2410 LINPUT I$
2420 IF SEG$(I$,1,1)<>"Y" THEN 2490
2430    FOR J=0 TO 10
2440       LET B$(J)=STR$(J)            'RESET B$()
2450    NEXT J
2460    MAT C$=NUL$                     'RESET C$()
2470    LET T=0                         'RESET TURN COUNTER
2480    GOTO 660
2490 STOP
```

```
2510 ' PRINT HOW BOARD IS NUMBERED
2520 PRINT
2530 PRINT "MOTIE WORLD"
2540 PRINT "  10"
2550 PRINT " /:\"
2560 PRINT "7-8-9"
2570 PRINT ":\:/:  ALDERSON"
2580 PRINT "4-5-6  INTERSTELLAR"
2590 PRINT ":/:\:  JUMP POINTS"
2600 PRINT "1-2-3"
2610 PRINT " \:/"
2620 PRINT "  0"
2630 PRINT "HUMAN EMPIRE"
2640 PRINT
2650 RETURN
2660
2670 ' ROUTINE TO RECORD CURRENT POSITIONS
2680 FOR J=0 TO 10
2690    LET C$(T)=C$(T)&B$(J)
2700 NEXT J
2710 RETURN
2720
2730 ' PRINT DISPLAY
2740 PRINT
2750 PRINT "  ";B$(10)
2760 PRINT " /:\"
2770 PRINT B$(7);"-";B$(8);"-";B$(9)
2780 PRINT ":\:/:  TIME";T
2790 PRINT B$(4);"-";B$(5);"-";B$(6)
2800 PRINT ":/:\:"
2810 PRINT B$(1);"-";B$(2);"-";B$(3)
2820 PRINT " \:/"
2830 PRINT "  ";B$(0);
2840 RETURN
2850
2860 ' PRINT INSTRUCTIONS
2870 PRINT
2880 PRINT "BACKGROUND---"
2890 PRINT "  IN THE DISTANT FUTURE HUMANS CONTROL MOST OF THE GALAXY."
2900 PRINT "TRAVEL BETWEEN SJAR SYSTEMS INVOLVES SPACE WARP JUMPS FROM"
2910 PRINT "ONE 'ALDERSON' POINT TO ANOTHER.  THE MOTIES ARE THE ONLY"
2920 PRINT "INTELLIGENT NON-HUMAN CREATURES EVER DISCOVERED.  ALTHOUGH"
2930 PRINT "BRILLIANT IN TECHNOLOGY, THE MOTIES CANNOT CONTROL THEIR"
2940 PRINT "POPULATION GROWTH AND DESPERATELY NEED NEW WORLDS.  EVER"
2950 PRINT "SINCE LEARNING OF THE ALDERSON JUMP POINTS THEY HAVE BEEN"
2960 PRINT "TRYING TO REACH AND OCCUPY THE HUMAN EMPIRE."
2970 PRINT
2980 PRINT "MAP OF JUMP POINTS BETWEEN MOTIE WORLD AND HUMAN EMPIRE:"
2990 GOSUB 2520
3000 PRINT "THE GAME---"
3010 PRINT "  MOTIE MAY BE PLAYED BY 1 OR 2 PLAYERS.  THE COMPUTER"
3020 PRINT "MAKES THE MOTIE MOVES IF THERE IS ONLY ONE PLAYER."
3030 PRINT
3040 PRINT "  THE EMPIRE IS PROTECTED BY 3 GUARDIAN STARSHIPS, LOCATED"
3050 PRINT "AT 0, 1 AND 3.  THE MOTIE VESSEL IS PLACED BY THE PLAYER"
3060 PRINT "OR BY THE COMPUTER AT ANY VACANT POINT."
3070 PRINT
3080 PRINT "  THE PLAYERS GO IN TURN, AND MUST MOVE IF POSSIBLE."
3090 PRINT "IN GENERAL, TO MOVE MEANS TO TRANSFER A PIECE TO AN ADJACENT"
3100 PRINT "VACANT POINT WHICH IS CONNECTED TO THE PRESENT LOCATION."
3110 PRINT "THERE ARE NO CAPTURES."
3120 PRINT
3130 PRINT "GUARDIANS WIN IF THE MOTIE IS TRAPPED (HAS NO LEGAL MOVE)."
3140 PRINT
3150 PRINT "MOTIES WIN IF STILL UNTRAPPED AFTER 15 TURNS, IF THERE IS"
3160 PRINT "3-TIME REPETITION OF POSITION, OR IF THEY REACH LOCATION 0."
3170 PRINT
3180 PRINT "GUARDIANS (*) CAN ONLY MOVE FORWARD (UP) OR SIDEWAYS,"
3190 PRINT "NEVER BACKWARD (DOWN).  FOR EXAMPLE, A GUARDIAN AT 3 MAY"
3200 PRINT "GO TO 2, 5, OR 6.  TO MOVE A GUARDIAN, TYPE 2 NUMBERS: FIRST,"
3210 PRINT "PRESENT LOCATION; SECOND, WHERE YOU WANT TO GO.  FOR EXAMPLE,"
3220 PRINT "35 MEANS THE GUARDIAN AT 3 WANTS TO GO TO 5."
3230 PRINT
3240 PRINT "THE MOTIE (&) CAN MOVE IN ANY DIRECTION.  FOR EXAMPLE, MOTIE"
3250 PRINT "AT 7 MAY GO TO 4, 5, 8, OR 10.  TO MOVE THE MOTIE, JUST TYPE"
3260 PRINT "THE LOCATION YOU WANT TO GO TO."
3270 PRINT
3280 PRINT "ALSO, TYPE S TO STOP, TYPE R TO RESIGN, TYPE H FOR HELP."
3290 PRINT
3300 RETURN
3310 END
```



This is NOT a Motie

The Mote in God's Eye by Larry Niven and Jerry Pournelle

It is the future.

Man has long ago conquered the galaxy and colonized the planets of the stars. Men have wandered through every edge and corner of their universe, have withstood every challenge and obstacle, and reigned supreme.

Then one day, from out of nowhere, a space ship appears. It carries the emissaries of a world so totally alien in creed and culture, so terrifyingly strange and bizarre, as to elude all comprehension or understanding. And yet it is a world as utterly frightening and dangerous as our own, our equal in power and technology. And perhaps in treachery and cunning.

Then, with horrible suddenness, the emissaries are accidentally killed and a danger signal has apparently been sent out. Now man is thrown into a headlong race, a race that leads man's star ships even into the center of a giant red sun, a race to find the world from which the ship has come and convince it of our goodwill.

Above all, this new world, so frighteningly strange, so eerie and alien, must be seen and reported on. These weird new beings are far too dangerous, far too cunning, for mistakes in understanding . . .

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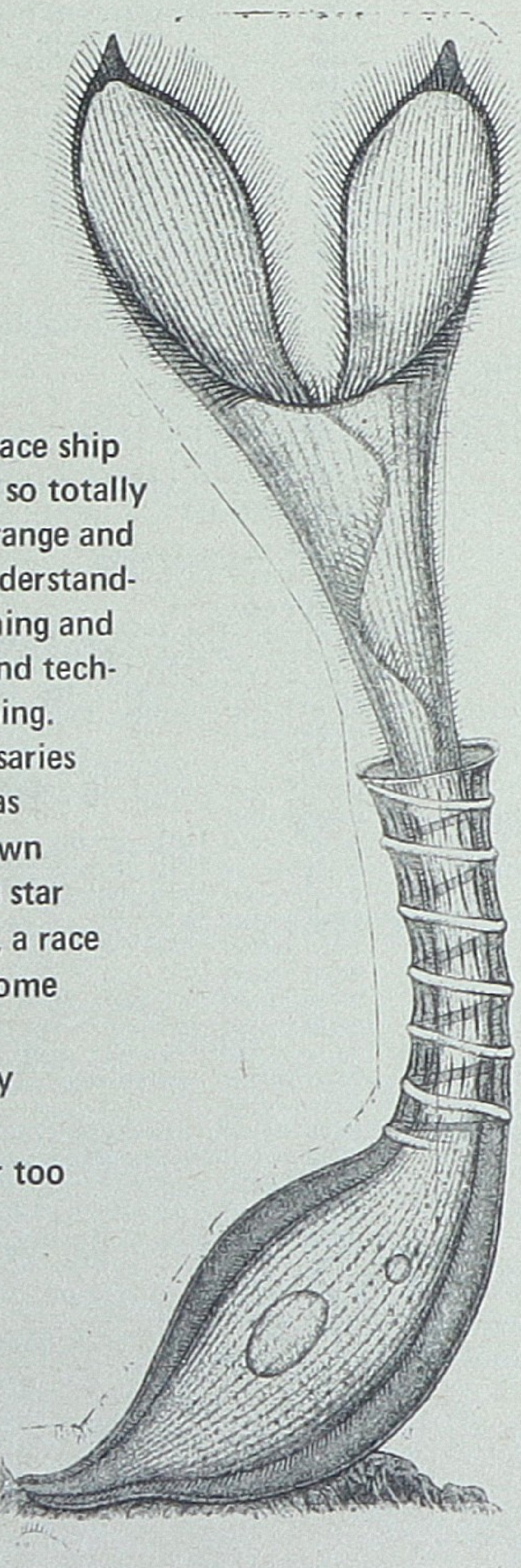
New York, NY 10020



This is NOT a Motie

```
RUN

MOTIE     13 DEC 75  12:42

MAKE ALL RESPONSES IN UPPERCASE CHARACTERS

WANT INSTRUCTIONS FOR MOTIE? YES

BACKGROUND---
  IN THE DISTANT FUTURE HUMANS CONTROL MOST OF THE GALAXY.
TRAVEL BETWEEN STAR SYSTEMS INVOLVES SPACE WARP JUMPS FROM
ONE 'ALDERSON' POINT TO ANOTHER.  THE MOTIES ARE THE ONLY
INTELLIGENT NON-HUMAN CREATURES EVER DISCOVERED.  ALTHOUGH
BRILLIANT IN TECHNOLOGY, THE MOTIES CANNOT CONTROL THEIR
POPULATION GROWTH AND DESPERATELY NEED NEW WORLDS.  EVER
SINCE LEARNING OF THE ALDERSON JUMP POINTS THEY HAVE BEEN
TRYING TO REACH AND OCCUPY THE HUMAN EMPIRE.

MAP OF JUMP POINTS BETWEEN MOTIE WORLD AND HUMAN EMPIRE:

MOTIE WORLD
  10
 /:\
7-8-9
:\:/:  ALDERSON
4-5-6  INTERSTELLAR
:/:\:  JUMP POINTS
1-2-3
 \:/
  0
HUMAN EMPIRE

THE GAME---
  MOTIE MAY BE PLAYED BY 1 OR 2 PLAYERS.  THE COMPUTER
MAKES THE MOTIE MOVES IF THERE IS ONLY ONE PLAYER.

  THE EMPIRE IS PROTECTED BY 3 GUARDIAN STARSHIPS, LOCATED
AT 0, 1 AND 3.  THE MOTIE VESSEL IS PLACED BY THE PLAYER
OR BY THE COMPUTER AT ANY VACANT POINT.

  THE PLAYERS GO IN TURN, AND MUST MOVE IF POSSIBLE.
IN GENERAL, TO MOVE MEANS TO TRANSFER A PIECE TO AN ADJACENT
VACANT POINT WHICH IS CONNECTED TO THE PRESENT LOCATION.
THERE ARE NO CAPTURES.

GUARDIANS WIN IF THE MOTIE IS TRAPPED (HAS NO LEGAL MOVE).

MOTIES WIN IF STILL UNTRAPPED AFTER 15 TURNS, IF THERE IS
3-TIME REPETITION OF POSITION, OR IF THEY REACH LOCATION 0.

GUARDIANS (*) CAN ONLY MOVE FORWARD (UP) OR SIDEWAYS,
NEVER BACKWARD (DOWN).  FOR EXAMPLE, A GUARDIAN AT 3 MAY
GO TO 2, 5, OR 6.  TO MOVE A GUARDIAN, TYPE 2 NUMBERS: FIRST,
PRESENT LOCATION; SECOND, WHERE YOU WANT TO GO.  FOR EXAMPLE,
35 MEANS THE GUARDIAN AT 3 WANTS TO GO TO 5.

THE MOTIE (&) CAN MOVE IN ANY DIRECTION.  FOR EXAMPLE, MOTIE
AT 7 MAY GO TO 4, 5, 8, OR 10.  TO MOVE THE MOTIE, JUST TYPE
THE LOCATION YOU WANT TO GO TO.

ALSO, TYPE S TO STOP, TYPE R TO RESIGN, TYPE H FOR HELP.

HOW MANY PLAYERS (1 OR 2)? 1
OK, I'LL MOVE THE MOTIE VESSEL, FIRST DETECTED AT 2

 * = GUARDIANS   & = MOTIE

  10
 /:\
7-8-9
:\:/:  TIME 0
4-5-6
:/:\:
*-&-*  ← Motie is at Jump Point 2
 \:/
  *   GUARDIAN (*) MOVE? 3,5
MOTIE (&) GOES TO 3

  10
 /:\
7-8-9
:\:/:  TIME 1
4-*-6
:/:\:
*-2-&  ← Motie is at Jump Point 3
 \:/
  *   GUARDIAN (*) MOVE? 02
MOTIE (&) GOES TO 0

  10
 /:\
7-8-9
:\:/:  TIME 2
4-*-6
:/:\:
*-*-3
 \:/
  &  ← Disaster! Motie is at Jump Point 0.
THE MOTIE VESSEL HAS REACHED THE EMPIRE WORLDS!
MAY ROCKEFORD PROTECT US!!

WANT TO PLAY AGAIN? YES
HOW MANY PLAYERS (1 OR 2)? 1
OK, I'LL MOVE THE MOTIE VESSEL, FIRST DETECTED AT 9
* = GUARDIANS   & = MOTIE

  10
 /:\
7-8-&  ← Here is Motie, at Jump Point 9
:\:/:  TIME 0
4-5-6
:/:\:
*-2-*
 \:/
  *   GUARDIAN (*) MOVE? 35
MOTIE (&) GOES TO 6

  10
 /:\
7-8-9
:\:/:  TIME 1
4-*-&
:/:\:
*-2-3
 \:/
  *   GUARDIAN (*) MOVE? 0-3
MOTIE (&) GOES TO 9
  10
 /:\
7-8-&
:\:/:  TIME 2
4-*-6
:/:\:
*-2-*
 \:/
  0   GUARDIAN (*) MOVE?
  .
  .
  .
and so on
```

```
  10
 /:\
7-8-9
:\:/:
4-5-6
:/:\:
1-2-3
 \:/
  0
```

JUMP POINT MAP

Read the
Book
and
Send us a
picture
of a
Motie

RESCUE

by Mac Oglesby

```
100 ' NAME:  RESCUE***
105 '
110 ' BY:  MAC OGLESBY ON 05/19/75
115 '
120 ' DESCRIPTION:  AS COMMANDER OF A RESCUE STARSHIP, THE USER SETS
125 '   OUT IN RESPONSE TO A DISTRESS CALL FROM THE STARSHIP KIEWIT.
130 '   THE PASSENGERS AND CREW CAN BE SAVED FROM CERTAIN DEATH IF
135 '   THE STARSHIP KIEWIT IS REACHED WITHIN A DOZEN MOVES.  CERTAIN
140 '   FACTORS COMPLICATE RESCUE EFFORTS.
145 '
150 ' INSTRUCTIONS:  TYPE "RUN" FOR COMPLETE INSTRUCTIONS.
155 '
160 ' CATEGORY:  GAMES***
165 '
170 ' LANGUAGE:  BASIC
175 '
180 ' INDEX LINE:
185 '     IS IT POSSIBLE TO !RESCUE THE !STARSHIP !KIEWIT?
190 '
195 '
280 ' INITIALIZATION
290 DIM D(12)                              'SAVE ROOM FOR DISPLAY STRING
300 RANDOMIZE
310 MAT READ B(6,6)                        'B(,) STORES DATA TO DETERMINE
320    DATA 1,0,1,0,1,0                    'IF RESCUE SHIP'S MOVE IS LEGAL.
330    DATA 0,1,0,1,0,1                    'A MOVE TO ADJACENT SQUARE IS OK
340    DATA 1,0,10,11,1,0                  'IF PRESENT B(,) VALUE + NEW B(,)
350    DATA 0,1,11,10,0,1                  'VALUE <> 0,2, OR 11.
360    DATA 1,0,1,0,1,0
370    DATA 0,1,0,1,0,1
380 MAT READ G(3)                          'READ DATA FOR PROHIBITED MOVES
390    DATA 0,2,11
400 PRINT
410 PRINT "*** MAYDAY *** MAYDAY *** MAYDAY ***"
420 PRINT "INTERSTELLAR STARSHIP KIEWIT CALLING."
430 PRINT "COMPUTER DISC FAILURE MODIFIED OUR NAVIGATIONAL SOFTWARE"
440 PRINT "AND WE HAVE SCRAPED AGAINST ASTEROID #ASR-33.  OUR HULL AND"
450 PRINT "LIFEBOATS ARE DAMAGED.  MOST OF OUR LIFE-SUPPORT SYSTEMS"
460 PRINT "HAVE BEEN DESTROYED.  IMMEDIATE ASSISTANCE IS ESSENTIAL."
470 PRINT "*** MAYDAY *** MAYDAY *** MAYDAY ***"
480 LET T=12                               'SAVE KIEWIT WITHIN T MOVES
490 FOR J=1 TO 6                           'REPLAY RETURNS TO HERE
500    FOR K=1 TO 6                        'P(,) STORES 6 BY 6 DISPLAY
510       LET P(J,K)=32                    'INITIALLY, EACH P(,)=32
520    NEXT K
530 NEXT J
540 LET W1=W2=0                            'RESET MOVE TALLY, RESET WIN FLAG
550 IF RND<.5 THEN 580                     'STARSHIP KIEWIT INITIALLY MOVES
560    LET M=1                             'SOUTH IF M=1
570    GOTO 590
580 LET M=-1                               'NORTH IF M=-1
590 LET R1=1+INT(RND*6)                    'R1 IS ROW OF RESCUE SHIP
600 LET C1=6                               'C1 IS COLUMN OF RESCUE SHIP
610 LET P(R1,C1)=38                        'RESCUE SHIP SYMBOL IS &
620 LET C2=1+INT(RND*2)                    'C2 IS COLUMN OF KIEWIT
630 LET R2=1+INT(RND*6)                    'R2 IS ROW OF KIEWIT
640 IF B(R1,C1)=B(R2,C2) THEN 660          'START KIEWIT AT OPPOSITION
650    GOTO 620                            'TRY AGAIN
660 LET P(R2,C2)=42                        'KIEWIT SYMBOL IS *
670 PRINT
680 PRINT "DO YOU NEED ,INSTRUCTIONS";
690 LINPUT I$
700 IF SEG$(I$,1,1)<>"Y" THEN 720
710    GOSUB 2320
720 PRINT
730 PRINT "RESCUE STARSHIP (&) IS AT ";STR$(R1);",";STR$(C1)
740 PRINT "STARSHIP KIEWIT (*) IS AT ";STR$(R2);",";STR$(C2)
750 PRINT "SAVE STARSHIP KIEWIT BY MOVING INTO ITS SQUARE WITHIN";T;"MOVES"
760 PRINT
770 PRINT "MAP AT START"
780 GOTO 840
790
800 ' PRINT DISPLAY
810
820 PRINT
830 PRINT "MAP AFTER MOVE";W1
840 PRINT "  1 2 3 4 5 6"                  'IDENTIFY COLUMNS
850 FOR J=1 TO 6                           '6 ROWS
860    PRINT STR$(J);                      'IDENTIFY EACH ROW
870    FOR K=6 TO 1 STEP -1                'ROUTINE TO IGNORE TRAILING SPACES
880       IF P(J,K)=32 THEN 900
890          GOTO 930
900    NEXT K
910    PRINT
920    GOTO 1060                                                   COUNT
930    LET D(0)=0                          'RESET DISPLAY STRING CHARACTER COU
940    FOR L=K TO 1 STEP -1
950       IF W2=0 THEN 1000                'NO WINNER YET
960          IF D(0)>0 THEN 1000           'WIN DISPLAY IS SET
970             LET D(2*L)=38              'SET UP WIN DISPLAY
980             LET D(2*L-1)=42
990             GOTO 1020
1000       LET D(2*L)=P(J,L)               'ASSEMBLE DISPLAY STRING
1010       LET D(2*L-1)=32
1020       LET D(0)=D(0)+2                 'COUNT CHARACTERS
1030    NEXT L
1040    CHANGE D TO D$
1050    PRINT D$                           'PRINT BALANCE OF ROW J
1060 NEXT J
1070 IF W2=0 THEN 1170
1080
1090    ' WINNER!!
1100                                                               KIEWIT"
1110    PRINT "THANK HEAVEN!!  YOU'VE SAVED THE PEOPLE ABOARD STARSHIP KI
1120    PRINT "REPLAY";
1130    LINPUT R$
1140    IF SEG$(R$,1,1)<>"Y" THEN 1160
1150       GOTO 490
1160    STOP
1170 IF W1<T THEN 1240                     'NOT TTH MOVE
1180
1190    ' LOSER
1200
1210    PRINT "DISASTER!!  THE PEOPLE ABOARD STARSHIP KIEWIT HAVE PERISHED
1220    PRINT "FROM COLD AND LACK OF OXYGEN."
1230    GOTO 1120                          'ASK ABOUT REPLAY
1240 LET W1=W1+1                           'TALLY MOVES
1250
1260 ' GET USER'S MOVE
1270
1280 PRINT "RESCUE STARSHIP'S MOVE (ROW,COL)";
1290 LINPUT A$
1300 IF SEG$(A$,1,1)<>"S" THEN 1330    'CONTINUE
1310    PRINT "PROGRAM HALTED"
1320    STOP
1330 IF A$<>"HELP" THEN 1600
1340
1350    ' HELP SECTION PRINTS LEGAL MOVES
1360
1370    PRINT "YOU ARE NOW AT (ROW,COL) ";STR$(R1);",";STR$(C1)
1380    PRINT "YOU MAY MOVE TO ANY OF THESE SQUARES (ROW,COL):"
1390    IF R1=1 THEN 1410
1400       PRINT "  ";STR$(R1-1);",";STR$(C1);
1410    IF C1=1 THEN 1430
1420       PRINT "  ";STR$(R1);",";STR$(C1-1);
1430    IF C1=6 THEN 1450
1440       PRINT "  ";STR$(R1);",";STR$(C1+1);
1450    IF R1=6 THEN 1470
1460       PRINT "  ";STR$(R1+1);",";STR$(C1);
1470    IF (3-R1)*(4-R1)<>0 THEN 1500  'NOT IN CENTER ROWS
1480       IF (3-C1)*(4-C1)<>0 THEN 1500  'NOT IN CENTER COLS
1490          PRINT "  ";STR$(ABS(7-R1));",";STR$(ABS(7-C1));
1500    PRINT
1510    PRINT "WANT THE COMPLETE INSTRUCTIONS";
1520    LINPUT I$
1530    IF SEG$(I$,1,1)="Y" THEN 1550
1540       GOTO 1280
1550    GOSUB 2320
1560    GOTO 1280
1570
1580    ' CHECK IF LEGAL MOVE
1590
1600 IF LEN(A$)<>3 THEN 1680               'A$ MUST BE 3 CHARACTERS
1610    CHANGE A$ TO A
1620    IF A(2)<>44 THEN 1680              'MIDDLE CHARACTER MUST BE COMMA
1630       LET R3=A(1)-48                  'R3 IS TRIAL ROW
1640       LET C3=A(3)-48                  'C3 IS TRIAL COLUMN
1650       IF (9-R3)*R3<0 THEN 1680        'R3 MUST BE A DIGIT
1660          IF (9-C3)*C3<0 THEN 1680     'C3 MUST BE A DIGIT
1670             GOTO 1710
1680 PRINT "YOU MUST TYPE 2 DIGITS SEPARATED BY A COMMA.  INPUT IGNORED."
1690 GOTO 1280
1700
1710 IF (6-R3)*(R3-1)<0 THEN 1830          'R3 MUST BE FROM 1 THRU 6
1720    IF (6-C3)*(C3-1)<0 THEN 1830       'C3 MUST BE FROM 1 THRU 6
1730       IF ABS(R3-R1)>1 THEN 1830       'CAN'T MOVE MORE THAN 1 ROW
1740          IF ABS(C3-C1)>1 THEN 1830    'OR 1 COLUMN
1750             IF ABS(R3-R1)+ABS(C3-C1)<>0 THEN 1780  'MUST MOVE
1760                PRINT "YOU MUST MOVE YOUR SHIP!"
1770                GOTO 1830
1780             FOR J=1 TO 3              'CHECK FOR PROHIBITED DIAGONAL MOVE
1790                IF B(R1,C1)+B(R3,C3)<>G(J) THEN 1810
1800                   GOTO 1830
1810             NEXT J
1820             GOTO 1860
1830 PRINT "ILLEGAL MOVE.  TYPE HELP IF YOU NEED IT.  INPUT IGNORED."
1840 GOTO 1280
1850
1860 LET P(R3,C3)=38                       'LEGAL MOVE, SO MOVE RESCUE SYMBOL
1870 LET P(R1,C1)=32                       'OLD LOCATION BECOMES A SPACE
1880 IF ABS(R2-R3)+ABS(C2-C3)<>0 THEN 1910  'NO WINNER YET
1890    LET W2=1                           'SET WIN FLAG
1900    GOTO 820                           'GO PRINT WIN DISPLAY
1910 LET R1=R3                             'UPDATE RESCUE SHIP'S LOCATION
1920 LET C1=C3
1930
1940 ' STARSHIP KIEWIT MOVE SECTION
1950
1960 IF ABS(R1-R2)+ABS(C1-C2)>2 THEN 2200  'RESCUE SHIP REMOTE, IGNORE IT
1965
1970    FOR J=1 TO 2
1980       LET R3=R2+M                     'CHANGE ROW
1990       IF ABS(R1-R3)>ABS(R1-R2) THEN 2020  'MOVED AWAY, CHECK LOCATION
2010          GOTO 2040
2020       IF (6-R3)*(R3-1)<0 THEN 2040  'OUT OF BOUNDS
2030          GOTO 2240                    'STILL ON BOARD, SO RECORD MOVE
2040       LET M=-M                        'REVERSE DIRECTION
2050    NEXT J                             'AND TRY ONCE MORE
2055
2060    FOR J=1 TO 2
2070       LET C3=C2+M                     'CHANGE COLUMN
2080       IF ABS(C1-C3)>ABS(C1-C2) THEN 2110  'MOVED AWAY, CHECK LOCATION
2100          GOTO 2130
2110       IF (6-C3)*(C3-1)<0 THEN 2130  'OUT OF BOUNDS
2120          GOTO 2160                    'STILL ON BOARD, SO RECORD MOVE
2130       LET M=-M                        'REVERSE DIRECTION
2140    NEXT J                             'AND TRY ONCE MORE
2145
2150    GOTO 2200                          'CAN'T MOVE AWAY, SO JUST MOVE
2160    LET P(R2,C3)=42                    'MOVE KIEWIT SYMBOL
2170    LET P(R2,C2)=32                    'OLD LOCATION BECOMES A SPACE
2180    LET C2=C3                          'UPDATE LOCATION
2190    GOTO 2270                          'GO PRINT NEW LOCATION
2200 LET R3=R2+M                           'CHANGE ROW
2210 IF (6-R3)*(R3-1)=>0 THEN 2240         'STILL ON THE BOARD
2220    LET M=-M                           'REVERSE DIRECTION
2230    GOTO 2200                          'AND TRY AGAIN
2240 LET P(R3,C2)=42                       'MOVE KIEWIT SYMBOL
2250 LET P(R2,C2)=32                       'OLD LOCATION BECOMES A SPACE
2260 LET R2=R3                             'UPDATE LOCATION
2270 PRINT "STARSHIP KIEWIT GOES TO ";STR$(R2);",";STR$(C2)
2280 GOTO 820                              'GO PRINT DISPLAY
2290
2300 ' INSTRUCTIONS
2310
2320 PRINT
2330 PRINT "THE YEAR IS 2087.  YOU ARE COMMANDER OF AN ORBITAL RESCUE"
2340 PRINT "STATION.  IN RESPONSE TO THE DISTRESS CALL FROM STARSHIP"
2350 PRINT "KIEWIT, YOU SET OUT TO TRY TO RESCUE ITS CREW AND PASSENGERS"
2360 PRINT "BEFORE THEIR OXYGEN IS EXHAUSTED."
2370 PRINT
2380 PRINT "THE PEOPLE ABOARD THE KIEWIT WILL BE SAVED IF YOU CAN MOVE"
2390 PRINT "INTO THE SQUARE IT OCCUPIES WITHIN";T;"MOVES."
2400 PRINT
2410 PRINT "THE ACTION IS DISPLAYED ON A BOARD OF 6 SQUARES BY 6 SQUARES."
2420 PRINT "THE SQUARE AT UPPER LEFT IS ROW 1, COLUMN 1."
2430 PRINT "YOU SPECIFY A MOVE BY TYPING 2 DIGITS (1-6) SEPARATED BY"
2440 PRINT "A COMMA.  THE FIRST NUMBER TELLS THE ROW AND THE SECOND"
2450 PRINT "THE COLUMN."
2460 PRINT
2470 PRINT "AT EACH TURN YOU MOVE THE RESCUE STARSHIP TO ANY ADJACENT"
2480 PRINT "SQUARE WHICH HAS A SIDE IN COMMON WITH YOUR CURRENT SUUARE."
2490 PRINT "YOU MAY MOVE DIAGONALLY ONLY BETWEEN THE 4 CENTER SQUARES,"
2500 PRINT "WHICH ARE (ROW,COL):  3,3  3,4  4,3  4,4."
2510 PRINT
2520 PRINT "STARSHIP KIEWIT ALSO MOVES, FOR THE COMPUTER MALFUNCTION"
2530 PRINT "PREVENTS TOTAL ENGINE SHUT-DOWN OR PROPER NAVIGATION.  AND"
2540 PRINT "NOTE:  KIEWIT'S AUTOMATIC METEOR AVOIDANCE SYSTEM HAS BEEN"
2550 PRINT "JAMMED 'ON' BY THE COLLISION, WHICH MEANS THE KIEWIT TENDS"
2560 PRINT "TO AVOID ANY OBJECT WHICH APPROACHES TOO CLOSELY."
2570 PRINT
2580 RETURN
2590 END
```

A SINGLE QUOTE ' BEGINS A REMARK

```
*** MAYDAY *** MAYDAY *** MAYDAY ***
INTERSTELLAR STARSHIP KIEWIT CALLING.
COMPUTER DISC FAILURE MODIFIED OUR NAVIGATIONAL SOFTWARE
AND WE HAVE SCRAPED AGAINST ASTEROID #ASR-33.  OUR HULL AND
LIFEBOATS ARE DAMAGED.  MOST OF OUR LIFE-SUPPORT SYSTEMS
HAVE BEEN DESTROYED.  IMMEDIATE ASSISTANCE IS ESSENTIAL.
*** MAYDAY *** MAYDAY *** MAYDAY ***

DO YOU NEED INSTRUCTIONS? YES

THE YEAR IS 2087.  YOU ARE COMMANDER OF AN ORBITAL RESCUE
STATION.  IN RESPONSE TO THE DISTRESS CALL FROM STARSHIP
KIEWIT, YOU SET OUT TO TRY TO RESCUE ITS CREW AND PASSENGERS
BEFORE THEIR OXYGEN IS EXHAUSTED.

THE PEOPLE ABOARD THE KIEWIT WILL BE SAVED IF YOU CAN MOVE
INTO THE SQUARE IT OCCUPIES WITHIN 12 MOVES.

THE ACTION IS DISPLAYED ON A BOARD OF 6 SQUARES BY 6 SQUARES.
THE SQUARE AT UPPER LEFT IS ROW 1, COLUMN 1.
YOU SPECIFY A MOVE BY TYPING 2 DIGITS (1-6) SEPARATED BY
A COMMA.  THE FIRST NUMBER TELLS THE ROW AND THE SECOND
THE COLUMN.

AT EACH TURN YOU MOVE THE RESCUE STARSHIP TO ANY ADJACENT
SQUARE WHICH HAS A SIDE IN COMMON WITH YOUR CURRENT SQUARE.
YOU MAY MOVE DIAGONALLY ONLY BETWEEN THE 4 CENTER SQUARES,
WHICH ARE (ROW,COL):  3,3  3,4  4,3  4,4.
```

SEE MAP OF OK MOVES BELOW *

```
STARSHIP KIEWIT ALSO MOVES, FOR THE COMPUTER MALFUNCTION
PREVENTS TOTAL ENGINE SHUT-DOWN OR PROPER NAVIGATION.  AND
NOTE:  KIEWIT'S AUTOMATIC METEOR AVOIDANCE SYSTEM HAS BEEN
JAMMED 'ON' BY THE COLLISION, WHICH MEANS THE KIEWIT TENDS
TO AVOID ANY OBJECT WHICH APPROACHES TOO CLOSELY.


RESCUE STARSHIP (&) IS AT 1,6
STARSHIP KIEWIT (*) IS AT 5,2
SAVE STARSHIP KIEWIT BY MOVING INTO ITS SQUARE WITHIN 12 MOVES.

MAP AT START
  1 2 3 4 5 6
1           &
2
3
4
5   *
6
```

Rescue Ship

Starship Kiewit

```
RESCUE STARSHIP'S MOVE (ROW,COL)? 2,5
ILLEGAL MOVE.  TYPE HELP IF YOU NEED IT.  INPUT IGNORED.
RESCUE STARSHIP'S MOVE (ROW,COL)? HELP
YOU ARE NOW AT (ROW,COL) 1,6
YOU MAY MOVE TO ANY OF THESE SQUARES (ROW,COL):
  1,5  2,6
WANT THE COMPLETE INSTRUCTIONS? NO
RESCUE STARSHIP'S MOVE (ROW,COL)? 1,5
STARSHIP KIEWIT GOES TO 6,2

MAP AFTER MOVE 1
  1 2 3 4 5 6
1         &
2
3
4
5
6   *
RESCUE STARSHIP'S MOVE (ROW,COL)? 1,4
STARSHIP KIEWIT GOES TO 5,2

MAP AFTER MOVE 2
  1 2 3 4 5 6
1       &
2
3
4
5   *
6
RESCUE STARSHIP'S MOVE (ROW,COL)? 1,3
STARSHIP KIEWIT GOES TO 4,2

MAP AFTER MOVE 3
  1 2 3 4 5 6
1     &
2
3
4   *
5
6
RESCUE STARSHIP'S MOVE (ROW,COL)? 2,3
STARSHIP KIEWIT GOES TO 3,2

MAP AFTER MOVE 4
  1 2 3 4 5 6
1
2     &
3   *
4
5
6
RESCUE STARSHIP'S MOVE (ROW,COL)? 22
YOU MUST TYPE 2 DIGITS SEPARATED BY A COMMA.  INPUT IGNORED.
RESCUE STARSHIP'S MOVE (ROW,COL)? 2,2
STARSHIP KIEWIT GOES TO 4,2

MAP AFTER MOVE 5
  1 2 3 4 5 6
1
2   &
3
4   *
5
6
RESCUE STARSHIP'S MOVE (ROW,COL)? 3,2
STARSHIP KIEWIT GOES TO 5,2

MAP AFTER MOVE 6
  1 2 3 4 5 6
1
2
3   &
4
5   *
6
RESCUE STARSHIP'S MOVE (ROW,COL)? 4,2
STARSHIP KIEWIT GOES TO 6,2
```

```
MAP AFTER MOVE 7
  1 2 3 4 5 6
1
2
3
4   &
5
6   *
RESCUE STARSHIP'S MOVE (ROW,COL)? 5,2
STARSHIP KIEWIT GOES TO 6,3

MAP AFTER MOVE 8
  1 2 3 4 5 6
1
2
3
4
5   &
6     *
RESCUE STARSHIP'S MOVE (ROW,COL)? 5,3
STARSHIP KIEWIT GOES TO 6,4

MAP AFTER MOVE 9
  1 2 3 4 5 6
1
2
3
4
5     &
6       *
RESCUE STARSHIP'S MOVE (ROW,COL)? 5,4
STARSHIP KIEWIT GOES TO 6,5

MAP AFTER MOVE 10
  1 2 3 4 5 6
1
2
3
4
5       &
6         *
RESCUE STARSHIP'S MOVE (ROW,COL)? 5,5
STARSHIP KIEWIT GOES TO 6,6

MAP AFTER MOVE 11
  1 2 3 4 5 6
1
2
3
4
5         &
6           *
RESCUE STARSHIP'S MOVE (ROW,COL)? 5,6
STARSHIP KIEWIT GOES TO 6,5

MAP AFTER MOVE 12
  1 2 3 4 5 6
1
2
3
4
5           &
6         *
DISASTER!!  THE PEOPLE ABOARD STARSHIP KIEWIT HAVE PERISHED
FROM COLD AND LACK OF OXYGEN.
REPLAY? NO
```

SEND A GAME TO PCC. IF WE PUBLISH YOUR GAME, YOU GET A FREE COPY OF *WHAT TO DO AFTER YOU HIT RETURN*, OUR BIG BOOK OF COMPUTER GAMES.

FINGERS TIRED? BUY TAPES!

Save wear and tear on your fingers (or claws, if you are a dragon). You can buy paper tapes of MOTIE and RESCUE.

From: Community Computer Center
1919 Menalto Avenue
Menlo Park, Ca. 94025

Price:
MOTIE $5.00
RESCUE $5.00
Postage $0.50
(California residents please add 6% sales tax)

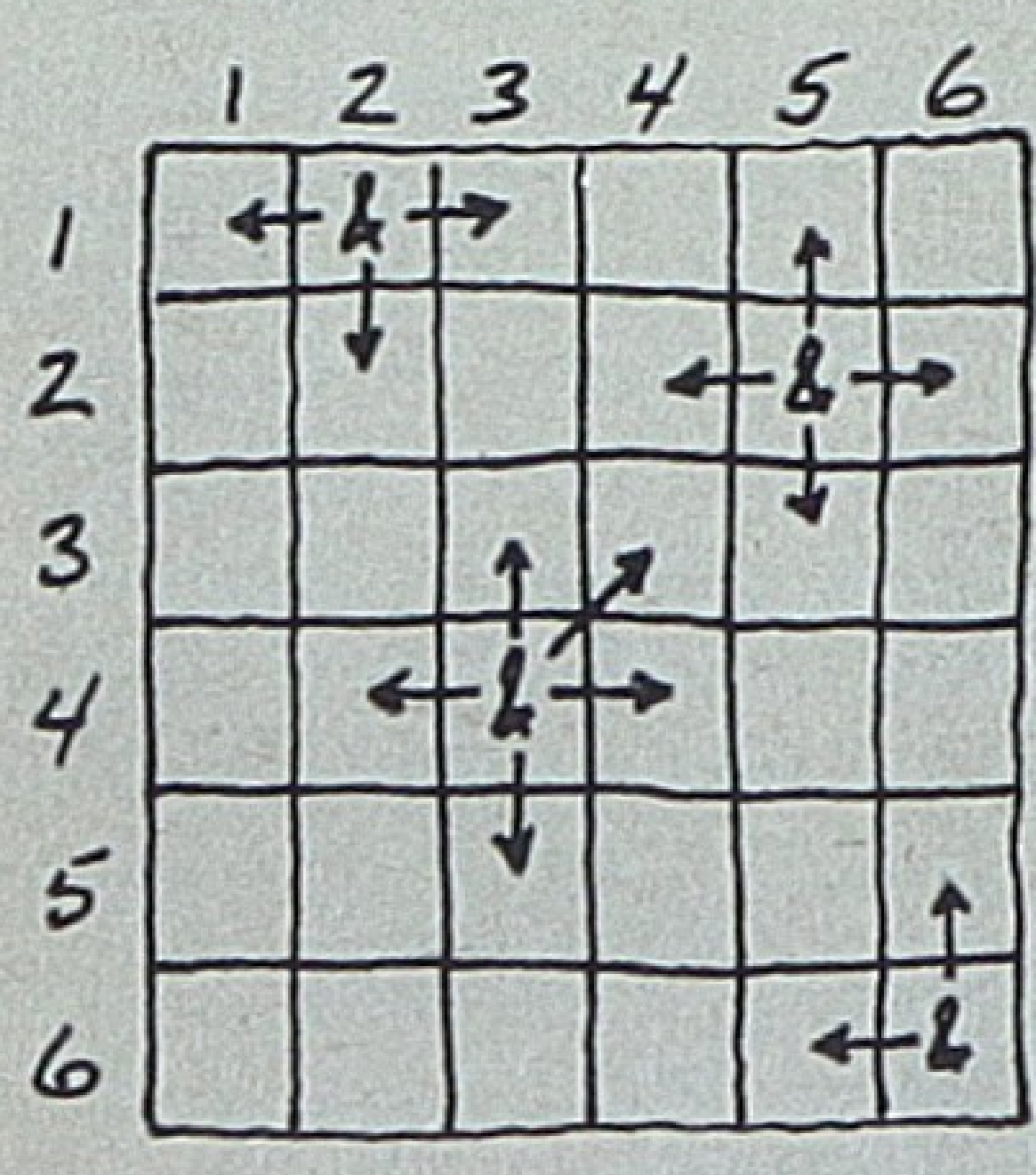
* * *

DARTMOUTH BASIC

RESCUE and MOTIE are written in Dartmouth BASIC. If you have trouble understanding the programs or translating them to your version of BASIC, you might want to get your very own *Dartmouth BASIC Reference Manual*. For info on this and other publications, get TM086, *Publications List*, a complete catalog of technical memoranda and other publications produced by the Kiewit Computation Center at Dartmouth College.

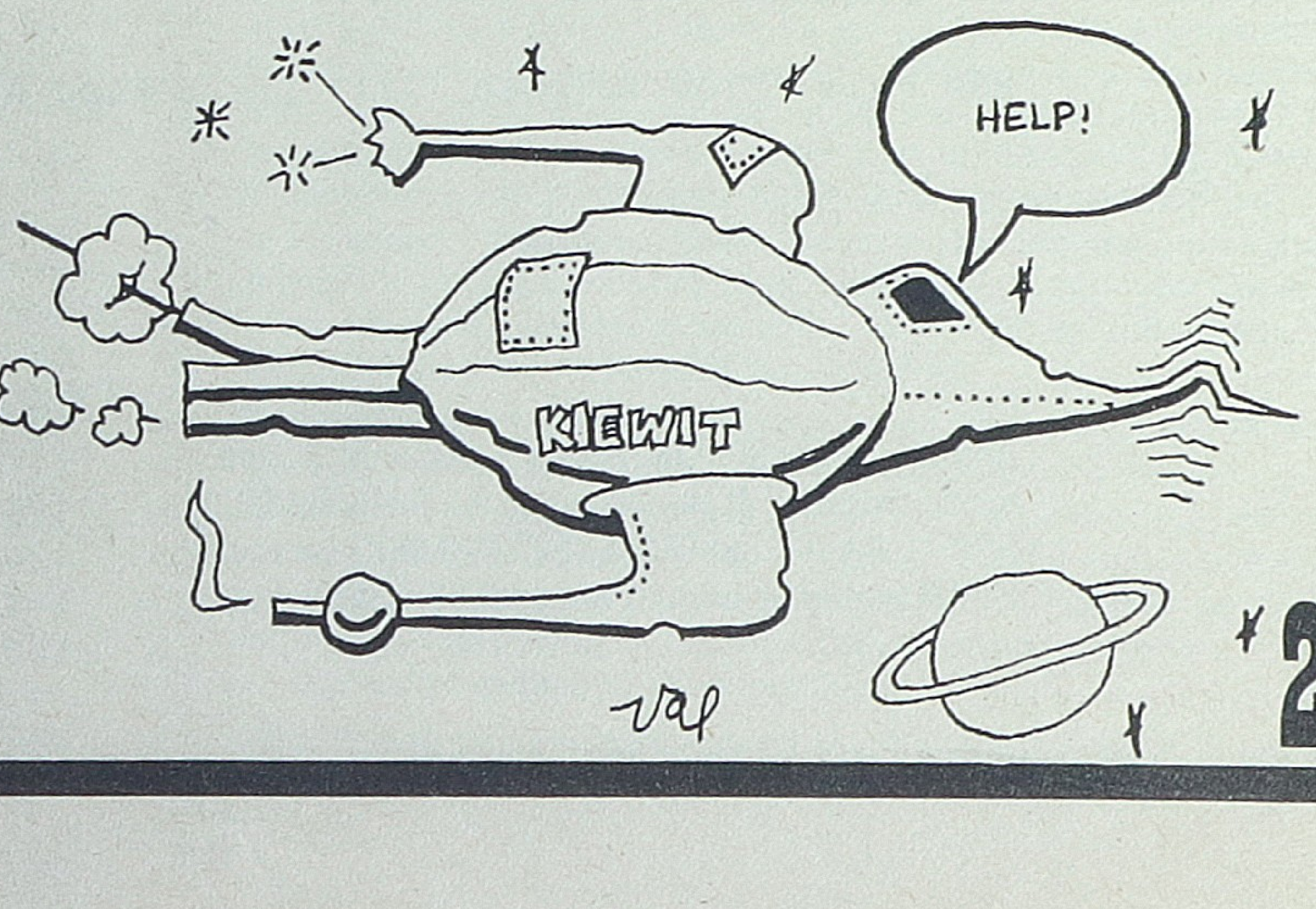
From: DTSS, Inc., Box 799, Hanover, NH 03755

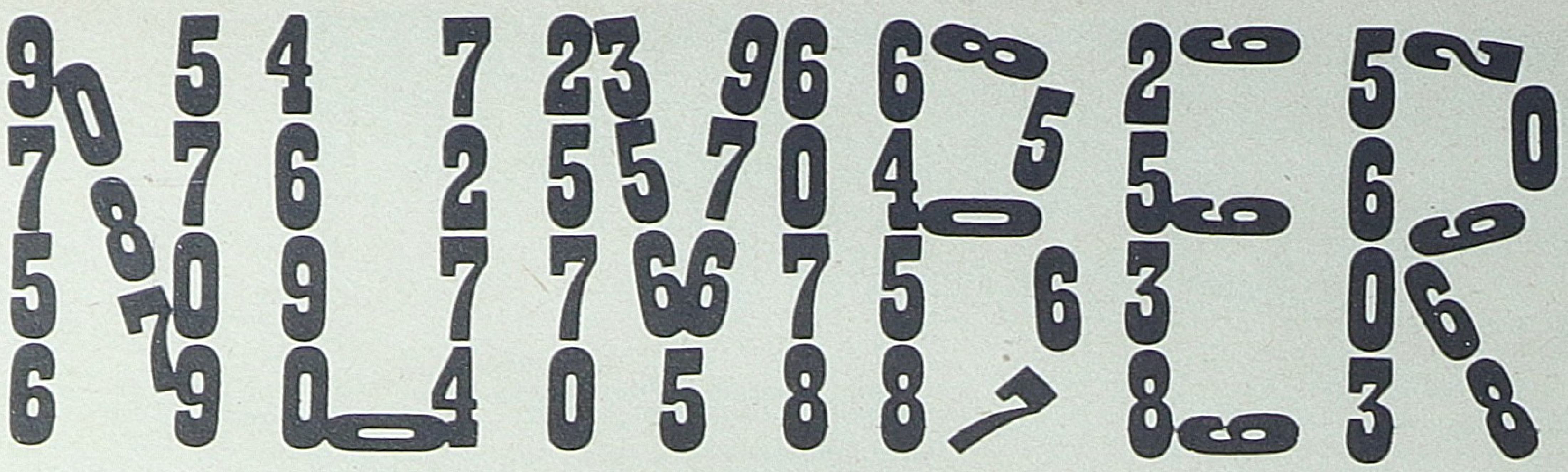
* * *



*.

ARROWS SHOW OK MOVES FOR THE RESCUE SHIP. DIAGONAL MOVES OK ONLY FROM A CENTER SQUARE TO ANOTHER CENTER SQUARE. CENTER SQUARES ARE
3,3 3,4 4,3 4,4





Continued from 75Nov PCC, pages 4 & 5. Last time (perhaps you recall) we left you to contemplate the following program to play NUMBER.

```
100 REM *** NUMBER - A NUMBER GUESSING GAME
110 LET X=INT(100*RND(1))+1 : PRINT
130 PRINT "I'M THINKING OF A WHOLE NUMBER FROM 1 TO 100."
140 PRINT "GUESS MY NUMBER!!!"
150 PRINT : INPUT "YOUR GUESS";G
180 IF G<X THEN PRINT "TOO SMALL. TRY A BIGGER NUMBER.":GOTO 150
190 IF G>X THEN PRINT "TOO BIG. TRY A SMALLER NUMBER.":GOTO 150
250 PRINT "YOU GUESSED IT!!! LET'S PLAY AGAIN.":GOTO 110
999 END
```

This is in ALTAIR BASIC. I think it will also run in BASIC-II or BASIC PLUS for the PDP II. Would someone try it & let me know?

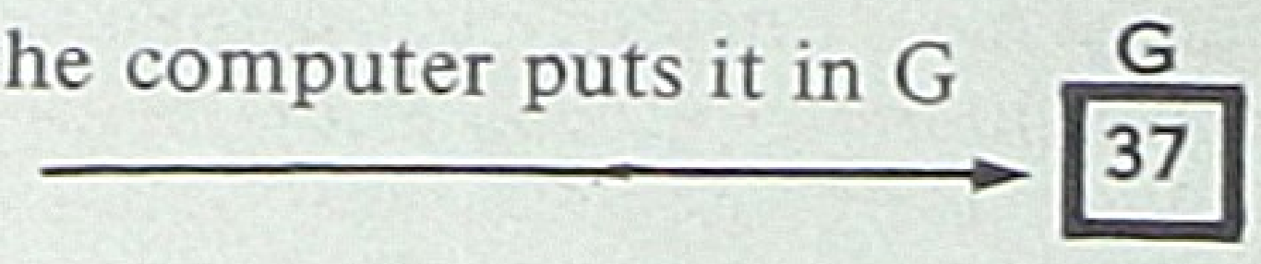
BUT NOT N PDP-8 EDUSYSTEM BASIC TELL YOU ABOUT THAT NEXT TIME

Hmmm . . . let's look at that strange INPUT statement in Line 150:

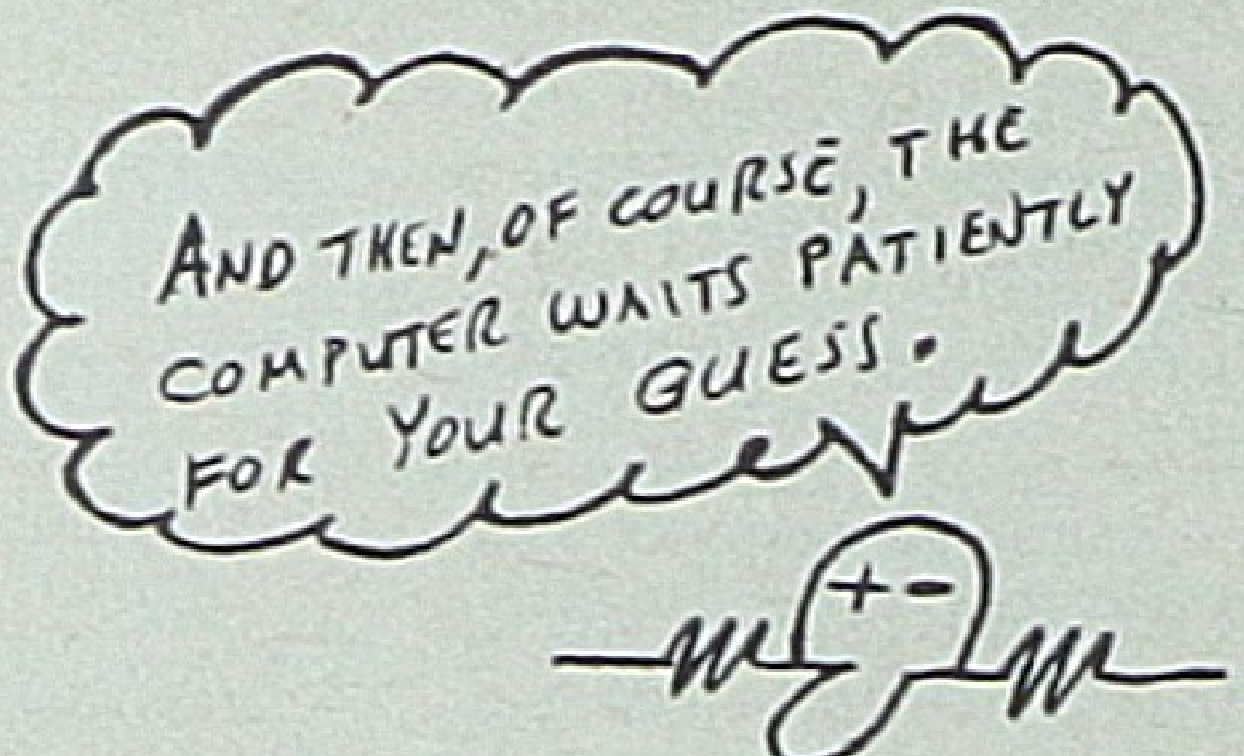
The statement **INPUT "YOUR GUESS";G** tells the computer to type **YOUR GUESS?**

We enter our guess

YOUR GUESS? 37 and the computer puts it in G

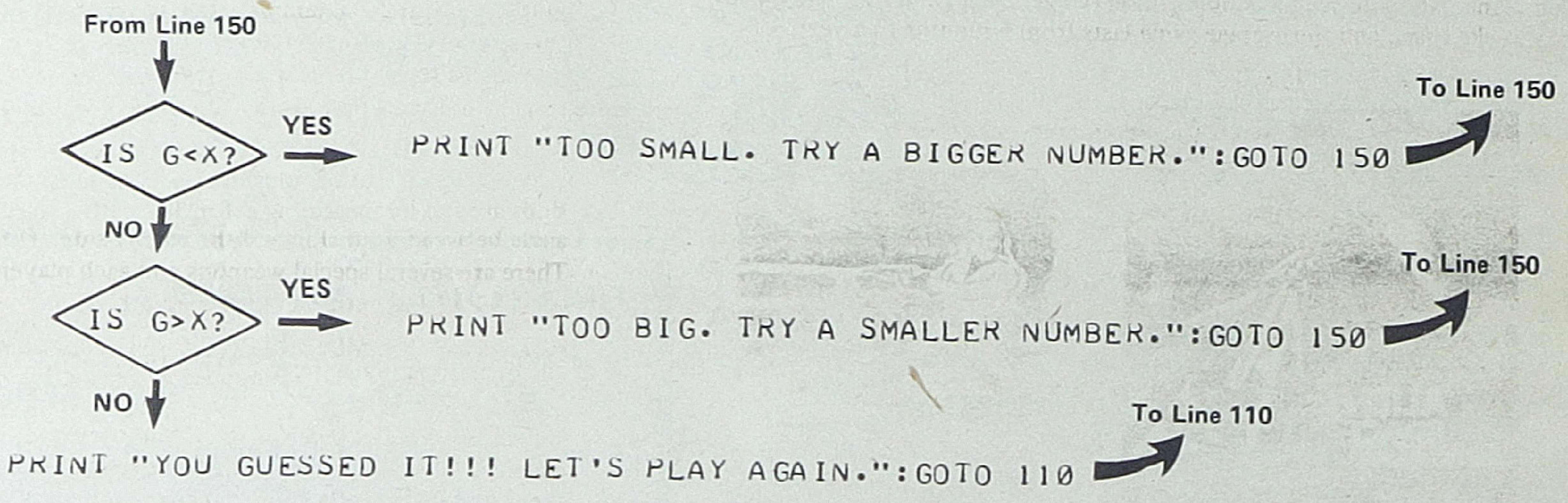


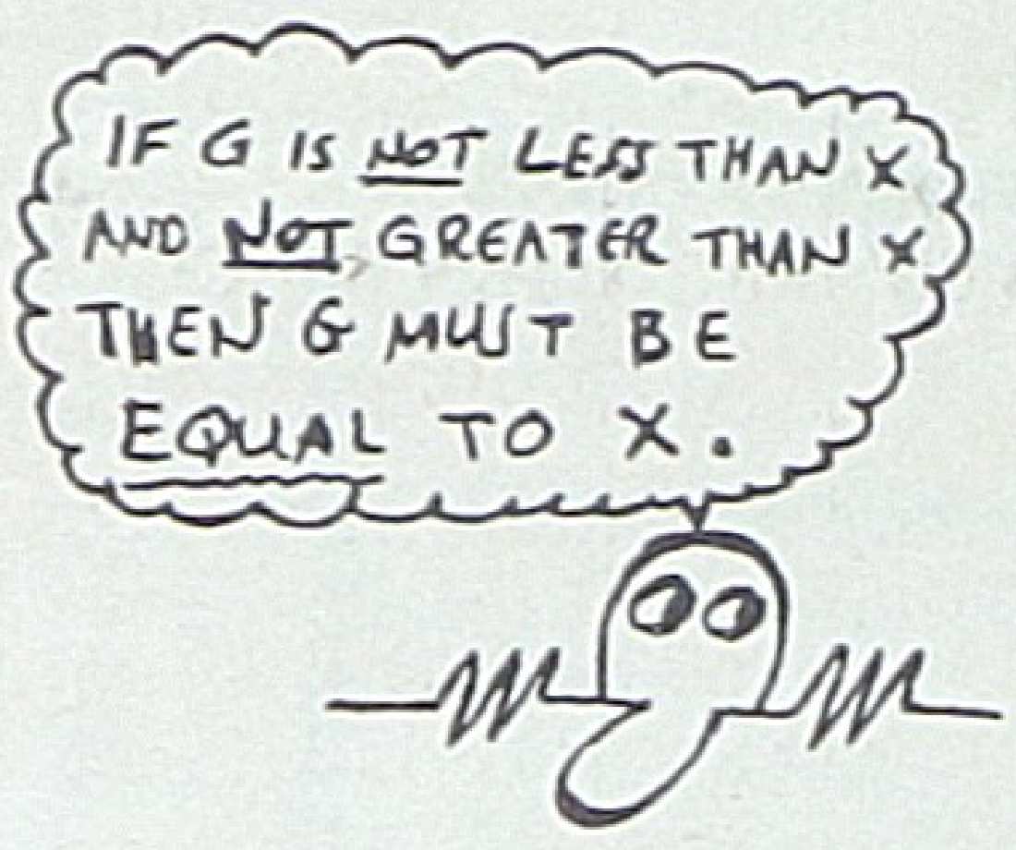
(Or, more pedantically, the computer assigns the value, 37, to the variable, G.)


AND THEN, OF COURSE, THE COMPUTER WAITS PATIENTLY FOR YOUR GUESS.

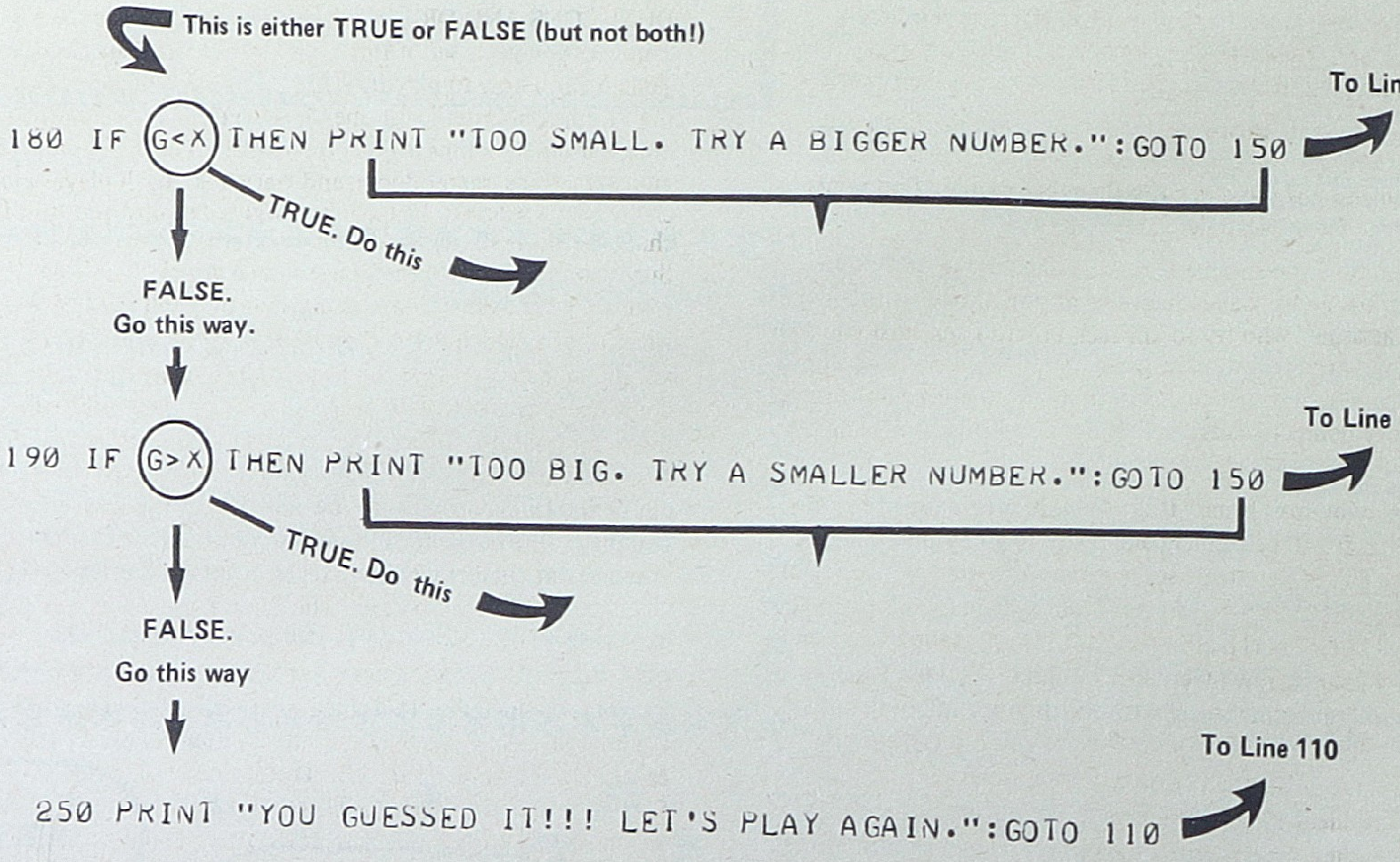
And so we get to Lines 180, 190 and 250.

They work like this:


From Line 150
IS G<X?
YES
PRINT "TOO SMALL. TRY A BIGGER NUMBER.":GOTO 150
To Line 150
NO
IS G>X?
YES
PRINT "TOO BIG. TRY A SMALLER NUMBER.":GOTO 150
To Line 150
NO
PRINT "YOU GUESSED IT!!! LET'S PLAY AGAIN.":GOTO 110
To Line 110


IF G IS NOT LESS THAN X AND NOT GREATER THAN X THEN G MUST BE EQUAL TO X.

OK, we'll say it again, a different way.


This is either TRUE or FALSE (but not both!)
180 IF G<X THEN PRINT "TOO SMALL. TRY A BIGGER NUMBER.":GOTO 150
To Line 150
TRUE. Do this
FALSE.
Go this way.
190 IF G>X THEN PRINT "TOO BIG. TRY A SMALLER NUMBER.":GOTO 150
To Line 150
TRUE. Do this
FALSE.
Go this way
250 PRINT "YOU GUESSED IT!!! LET'S PLAY AGAIN.":GOTO 110
To Line 110

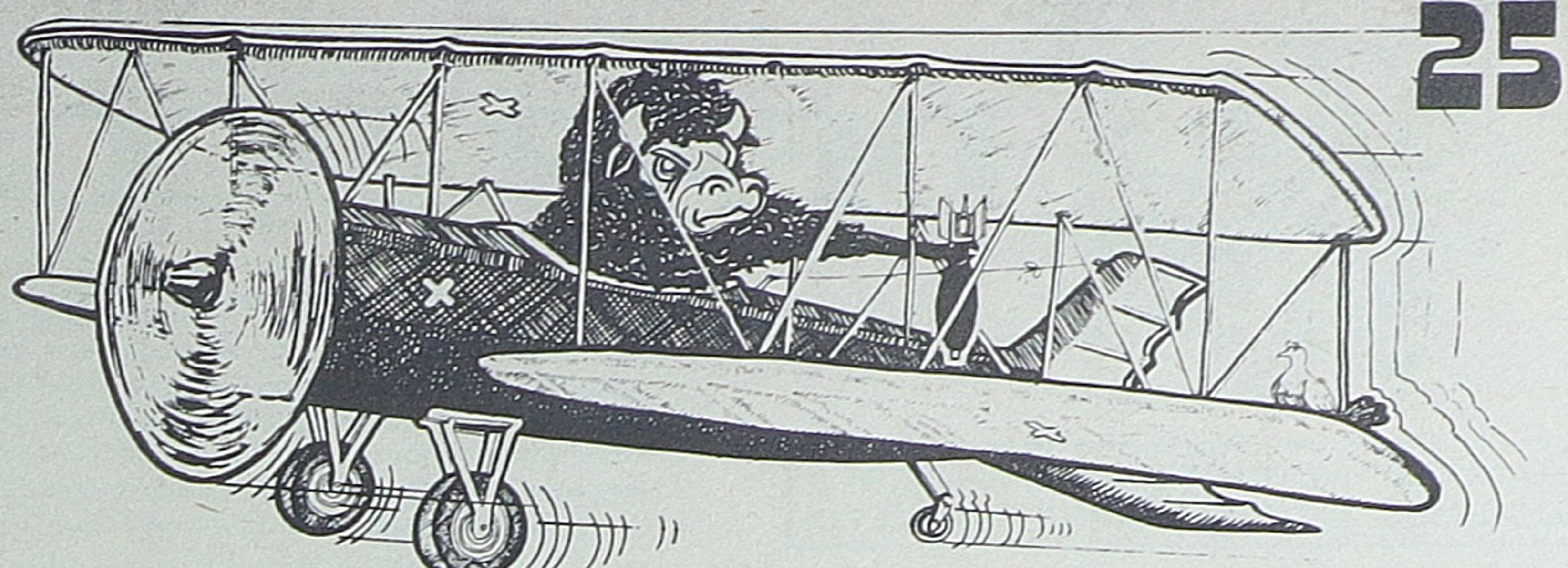
Another example? OK, here is a simple little coin tosser program. It should run in ALTAIR BASIC, PDP-11 BASIC and EDUSYSTEM BASIC for the PDP-8 (you may have to add an END statement).

```
100 REM *** COIN TOSSER
110 FOR K=1 TO 20
120 LET R=RND(1)
130 IF R<.5 THEN PRINT "TAILS",
140 IF R>=.5 THEN PRINT "HEADS",
150 NEXT K
```

FLYING BUFFALO

BY

RICHARD LOOMIS



It's been almost two years since we reported on computer-games-by-mail from Flying Buffalo. The Buffalo seems to be thriving, with lots of new stuff, including both play-by-mail and table top games from the world of fantasy and science fiction.

Flying Buffalo Inc. is a small company dedicated to the production of games for the entertainment of people of all ages. We have two kinds of games. We sell table games which you play with your friends on the kitchen table. We also have some play-by-mail games, which are a little harder to describe.

If you want to play one of our play-by-mail games, you send us the game fee and tell us which game you want to play. We accumulate enough players to fill the game, and then start the game. You would be in a game with players from around the country (sometimes from other countries as well). Each two weeks, you fill out a turn sheet giving us specific instructions for what you want to do that turn. We take all the turn sheets and feed the numbers into our computer (a Raytheon 704 minicomputer). We get back a printout telling what happened to each player that turn. The printout is mailed to you along with a new turn sheet. You discover that player No. 3 has destroyed one of your spaceships, and player No. 7 has invaded one of your planets. Also, you find that the new planet you just went to with your super-battleship belongs to player No. 3 (aha). So you instruct your battleship to blast player No. 3 off his planet, your reserve ships to rush to the invaded planet, and you send a couple cruisers to get back at No. 7. The moves are two weeks apart, and the average game lasts from 6 months to a year.

PLAY-BY-MAIL GAMES

RAUMKRIEG – A tactical space. game. Each player has 10 space ships (one flagship, three battlecruisers, and 6 scouts). The object is to destroy as many ships as possible belonging to other players. Rules cost $0.15 and the game fee is $4.50.

MOON BASE – A simple search-and-destroy game set on the moon. Each player has artillery, mines (moving and fixed) "crawlers" and command posts. You find the other players' command posts and destroy them before they find yours. Rules cost $0.25 and the game fee is $4.50 per game.

TIME TRAP – The only *real* time travel game I've seen. Try to outguess your opponents. If you guess wrong, go back and change what you did last turn! Very simply, each player has 5 "assasins" who try to kill each other. Each turn you move your 5 men around, plus you have the option of using up some of your saved up "energy" to go back into the past and change one or more of your previous turns. Your men accumulate victory points by surviving. Rules cost $0.15 and game fee is $4.00 per game.

STARWEB – Out newest play-by-mail game. It is not quite programmed for the computer yet, but I hope that it will be running and ready to go by the time this article is printed (January). This is a strategic space game. You start with control of a star system in a universe with 240 star systems. Your system is connected to several other systems by a "GATE" which allows instant transportation between the star systems. You have industry, raw materials, and ships. You use your industry and raw materials to build more ships, with which you explore the neighboring star systems. If you are the first player there, you can capture the systems and expand your empire. Eventually you will meet other players, and must decide whether to make alliances and trading agreements, or start a war. (You don't know how many other players are in the game). The most interesting thing about this game is that you pick what kind of "creature" you want to be before you start. For example, you can decide to be an empire builder. You get victory points for owning planets which have large populations, industry, or raw material production. The more worlds you own, the more industry you build, the more points you get. Or you can decide that your race is a race of merchants. You get points for carrying raw materials from planet to planet, or for building "consumer goods" with your raw materials. If you decide to be a pirate, you get points for plundering worlds and capturing spaceships. If you decide to be an Apostle, you get points for converting the populations of other planets to your religion. (If you convert the whole population of a planet, you gain control of the planet!). You also get points for each of your people who get killed (martyrs), but lose points for every shot you fire (you are a pacifist!). You can even be a Berserker. Berserkers are robots. They don't worry about the population limits on world they control. Berserkers get victory points for killing people, destroying ships, and blowing up entire planets! We haven't decided on a game fee for STARWEB , but it will probably be a set-up fee plus a per turn fee.

TABLE TOP GAMES

STARLORD – A strategic space game for 2 to 8 players. It is probably best with 4 to 6 players. It is similar to STARWEB. Each player starts with a star system and a large stockpile of raw materials. You have a list of 20 different kinds of ships to build. You build ships and fly to other star systems. When you get there, you find out how many raw materials the system produces. You load up the raw materials on your transport ships and carry them back to your home system to build more ships. There are no pieces for STARLORD. Included are plastic charts. Each time you build a new ship, you write it with a grease pencil on your chart. Included are charts, maps, and table for four players. The game costs $5.00.

STELLAR CONQUEST – One of the best space games around. A strategic space game, but much more complex and lengthy than STARLORD. It is for 2 to 4 players. You capture star systems and produce ships. But in SC you must put colonies on the planets, and the colonies grow. This game adds research. You can spend part of your production on weapons research, ship movement research, or industry research. Example, each player starts with the capability to move two spaces per turn with each ship. If he spends 30 of his industrial capacity on movement research, his ships may move 3 spaces per turn. You have 4 movement turns, and then a build turn. The game goes for 40 turns. Price is $9.00.

ALIEN SPACE – A tactical space game with a rules booklet and 8 cardboard ship drawings. This game is played on a large table, or on the floor. You move your ships around by measuring off inches with a rule, and you fire by estimating the angle between your ship and the enemy ship. (I fire a portion orpedo at 83 degrees). There are several special weapons and each player has his own. ALIEN SPACE costs $4.50 and extra ships are $3 a set.

HELMS DEEP & MINAS TIRITH – Games based on the Tolkein series *Lord of the Rings*. HELMS DEEP is an easy game with a few pieces, and can be played in 30 - 45 minutes. It is a very good game to start with, for people who have not played this kind of game before. But it is not so simple that it gets boring. I have played it dozens of times. The evil Orcs and Dunlanders are trying to climb over the wall, kill the good guys of Rohan, and kill King Theoden. (Price $3.00) MINAS TIRITH has a bigger map, lots more counters, and takes longer to play. Again the good guys are defending, and the bad guys are trying to break into the city. Price is $5.50.

DUNGEONS AND DRAGONS – This game has started a whole new field of gaming. You get a set of three booklets of rules, which describe how to set the game up and how to play it. This is a pencil and paper game. One player must be the "DungeonMaster". He spends several hours before the game preparing a dungeon for the other players to explore. The dungeon is people with various monsters, traps, secret doors, and treasures. Each player picks what kind of character he wants to be (fighter, magic user, etc) and rolls the dice to see his characteristics (strength, wisdom, dexterity, etc). When the players are ready, they march down into the dungeon in a group. The DungeonMaster tells them what they see as they move along, and they tell the DM which direction they wish to turn, which doors they want to open, etc. The idea is for the players to kill the monsters, escape the traps, and find the treasures. In this game the players don't really compete with each other. They help each other kill the monsters, and share the treasure. I guess they are really competing with the DungeonMaster to see if they can outguess him. If you can manage to get some treasure and get back out of the Dungeon with it, you can "keep" the treasure until the next time you play. The character that you went in with gains "experience". The next time you use that character, he will be stronger and better. You can keep using the same character until he gets killed. The game is great fun, but quite lengthy and fairly expensive. The basic set of 3 rules books costs $10. Plus, you will probably want the GREYHAWK supplement (another rule book) for $5, and a set of the special dice (a four sided die, an 8 sided one, a 12-sided one, and a 20 sided one) for $3. If you don't want to spend that much, you can get a similar but less elaborate game called TUNNELS & TROLLS. This is one booklet for $3, with a supplement for $1, and it uses regular dice. There are enough differences in the game that it is worth buying both if you can afford it. If you don't want to have to set up your own dungeon, there is an easier and shorter game. It is just called DUNGEON! This game has a map, plastic pieces, monster cards, treasure cards, and can be learned in 15 minutes. I takes from ½ hour to 2 hours to play, and is for 2 to 12 players. It is simple, lots of fun, a real family game. I am giving it to my friends who have children, because it is simple enough for 8 – 10 year olds, but still complex enough for adults to have fun with. It costs $12.50.

THE EMPIRE OF THE PETAL THRONE – This is the deluxe fantasy game set on Tekumel, an alien planet where a cosmic cataclysm stranded human and extra-terrestrial beings. A hostile world of poisonous flora and fauna, with intelligent and vengeful races! This game has three large, very colorful maps (plastic treated paper that won't tear), and a rule book detailing backgrounds, rules and data on life forms and the language of Tekumel. There are no pieces, however. You have to use your own miniatures. The price is $25.

All of these games are available postpaid from Flying Buffalo Inc, P. O. Box 1467, Scottsdale, AZ, 85252. (We will send COD for $1 extra.)

DEAR PCC:

RANDOM THOUGHTS ON COMPUTER COURSES, KIT BUILDING CLASSES ETC.

For the past seven years I have been trying to establish classes relating to computers in a small (700-900 students) high school with limited success. I thoroughly agree with Lee Felsenstein ". . . The important thing is you have to get others involved. You'll break your fanny doing it, but if you want to get more than a one terminal minimum system you are going to have to substantiate your need . . ."

The traditional approach was followed in my earlier attempts (i.e., course approved by: 1) Dept. Head, 2) principal, 3) superintendent, 4) schoolboard.) There are so many blind alleys, dead-end streets, etc., to this approach (as learned from bitter experience) that I would discard it immediately. Moreover it fails completely to consider the kids for which the project was intended in the first place.

A one semester course was finally approved for the 1974-75 school year with the provision that no school funds be used.

Generous vendors were cajoled, wheedled, and mis-led (unintentionally, of course). Equipment was loaned or demonstrated for periods of one hour to a week at a time. We tried everything from programmable calculators to time shared terminals, from keyboard programming to manually punched cards, and CRT outputs to printers and x-y plotters.

This was probably the most disorganized course I have ever taught. No textbooks – just dittoed material lifted from various authors (Bob Albrecht included). We passed around manufacturers' operation manuals while jumping from no language to BASIC to FORTRAN and back again. The course structure was dictated by which vendor was coming through that week. Still no money spent, but much learning going on no matter how disorganized we were. We finally ran out of vendors.

The high school math teachers (4) then formed an association to acquire equipment and whatever else might be needed. The teachers dug into their own pockets for money. We found a disreputable office supply company which sold us a used programmable calculator at a new price with no down payment. The contract was passed on to an "unsuspecting" local bank showing a substantial down payment which the supply company told us was their contribution to our program – anything for (to) the schools. The class was now in business.

Our next project was to raffle a $15 calculator. This netted us about $100 to add to our association dues. We now had enough to meet our payments for the remainder of the school year plus the summer months. Our entire math department budget for 75-76 was set aside to meet payments for this school year, and we are now holding our second annual calculator raffle to carry us through the summer.

Sometime last summer I happened to send in a membership to the Oregon Council for Computer Education and received a copy of the PCC news. I was hooked. My 11-year old son and I rushed to Menlo Park for a visit to CCC and PCC. We talked, used computers, bought back copies of PCC news and books, had a look at your Altair and came away fully charged, what a great group of people.

On pouring over PCC news I realized what fools we had been – re: calculator, education, etc. How our eyes were opened!

Some months later – we are now trying to jell a computer group (possibly non-profit corp.) for educational and community uses. We are building our own Altair (once again on a time payment plan). But that's another story for a later time.† ↗

The original intent of this report was to discuss plans for a kit building class for kids. This is to be a fun class within our somewhat formal education system. My approach to the computer class was so miserably received that I decided to reverse the procedure and:

(1) See if the students wanted and would sign up for such a course
(2) Seek support from department teachers and school counselors

Once student desire is shown, we will let them help to involve those above who rule. We must eventually decide on what direction the class will take. Should the students decide what projects they will build or should there be some direction provided? Could they build a computer in kit form over a period of time and thus help support the existing computer class?

I must remember to keep it fun even though they will gain some skills and maybe even a little knowledge along the way.

Where will the money for the kits come from? Maybe our outside non-profit computer corp can help in this. Buy the kits, pay the kids for building them in return for the finished projects. Then donate computer time to the computer class and other school departments.

Well let's forge ahead. Any ideas from you out there in computerland will be appreciated. We will start by placing a notice in the school bulletin for a meeting of interested students before going off on a wild goose chase. Then we will appeal to all school and community people interested in kids for aid – parts, kits, money, anything. Not too fast though – why not wait to see what the kids want to do? This is their class.

Now I appeal to all of you for ideas on how to keep this thing going. I may have a tiger by the tail. Who ever heard of school being fun? All for now – another report later.

Don Inman,
350 Nelson Road
Scotts Valley, Ca. 95066

† We are calling our group *Mountain Digital Group*. We are putting the final touches to our ALTAIR 8800 and should have it up running by Christmas.

THE CLASSIC USER LOOP

We are a known group of four owners of CLASSIC computers in educational settings:

LO*OP CENTER
8099 La Plaza
Cotati, Ca. 94928
Liza Loop, Anthony Lynn, Paul Kruger, Sarah Goldes

DICK DORF
Dean, Division of Extended Learning
UC, Davis
Davis, Ca. 95616

DAN ISAACSON
Cordova Senior HS
2239 Chase Drive
Rancho Cordova, Ca. 95670

FATHER FOLEY
St. Mary's School
Stockton, Ca.

I believe there are others, so please pass this letter on.

The computer world seems to be producing newsletters right and left, so I suggest we keep this one short, sweet, and oriented toward solving our problems. LO*OP CENTER will be glad to publish it unless somebody else offers, I suggest one or two pages whenever we receive that much important material instead of a periodical stuffed with filler. So please send a few lines on your pressing problems and frustrations, your exciting discoveries, and, most important, your routine applications. Do let me know if you'd like your material reporduced as is or edited.

If publication costs become burdensome, we'll ask for donations. I look forward to hearing from all of you.

Liza Loop
Director, LO*OP CENTER

SPARK

The average engineer receives from three to twelve magazines a month (besides *Playboy*). Any addition to that reading load must pass the test of non redundancy, and must also provide him with information necessary to either enhance his technical knowledge or to improve his understanding of the area in which he practices. After reading one issue of SPARK, I am adding it to my load.

This issue (Spring 75) ran the gamut from Unionization of Engineers (they're for it) to worker safety (for), to Engineers working during strikes (against) and general Corporate ethics (against). This magazine makes little pretense of being impartial and even handed. This is understandable, since such publications are not get-rich-quick operations, and those who make the sacrifices inherent in such publications need powerful motivation. Most engineers should be able to supply balance from their other inputs and the application of sound engineering judgement.

The implication in several of the articles that engineers would automatically make socially desirable decisions if only they had the strength of unionization is open to question. It is unionized automobile workers who on occasion sabotage cars that other workers purchase at great prices, just to work out their personal pique. But it can't be denied that the organized engineer who does choose to make an ethical stand contrary to management is in a stronger position to make that stand. I only question whether most would bother to use that strength for anything beyond personal economic advantage.

It may surprise a lot of liberal arts grads to know that engineers have been agonizing the question of the social and environmental impact of their works for many years. A look at the Code of Ethics of the National Society for Professional Engineers shows that it, like the ten commandments, would bring about an ideal world if everyone were to adhere to its rules religiously. The problem for the engineer has always been interfacing these ideal rules with the real world, and surviving, This mag may help some of us make the hard choice.

O.S. (The Old Soldier)

Publication of the Committee for Social Responsibility in Engineering, 475 Riverside Drive, New York NY 10027, $1.00/issue, $10.00/year (includes membership) with various discounts for unemployed ($2.00), student ($5.00) broke ($1.00) and affluent (Over $10.00).

ACCESS TO ENERGY

A Pro-Science, Pro-Technology, Pro-Free enterprise monthy newsletter –

Box 2298 Boulder, Colorado 80302
Published by Dr. Petr Beckman, EE Professor,
University of Colorado
Subscription, $6.00/year

If anyone rates the title of "Devils Advocate" of the alternate energy source field, it would have to be Dr. Beckman. While some of the more responsible pro alternate energy publications are careful to point out the limitations of wind, water, solar and biomass, others will give the impression that the only reason every home in the United States does not have total energy independence is the greedy supression of necessary technology by the "Energy Cartel."

Dr. Beckman has nice things to say about nuclear energy and bad things to say about anti-nuclear forces and their arguments, things that have to be said and examined by us if we are going to make informed decisions in the energy field.

O.S. (The Old Soldier)

73 magazine for radio amateurs

Articles for 73 . . . the readers are hams and experimenters . . . the magazine has been emphasizing the fun of building . . . or pioneering. I need articles on the hardware side which tell what you need in hardware to do what . . . for what applications. How to hook things together. How to get them working . . . what to look for when there is trouble . . . where to get more info on the circuits.

While most of the articles in 73 are ham radio oriented, we do go off on all sorts of tangents and as a result the magazine has gathered a good readership of experimenters as well as hams. Much of the article material has to do with construction projects and little is written for the scientist.

Software . . . I'd like to have articles telling the difference between various computer languages so readers will understand what is involved in them . . . definitions in detail of assembly language vs compiler vs editor vs monitor vs executive vs all the other terms used loosely and specifically. I'd like to have it so readers would be able to cope with computer literature eventually.

I need articles which are fundamental . . . written for high school grads, not engineers . . . and written in English, not computerese. We'll have to teach the computer language of flags, registers, memory dumps and compilers. What we need is an enthusiastically written book on the subject of basic computers to run chapter by chapter in 73. Unfortunately no such book has yet been written, to my knowledge. It would be something like an expanded encyclopedia . . . taking each computer term and explaining it thoroughly. On the hardware end it would go into circuits which are available in kit form, boards which are available . . . with home building plans for the constructors.

Computer hobbyists want articles on peripherals . . . controllers, on all of the new gadgets. They want to know what ROMs are . . . EROMs, PROMs, RAMS, core, dynamic memory, static memory. . . they want to know how registers work, ALUs, what the differences are between 8080s, 6800s, 6501s, 6502s, F8s etc. They want to have some idea of what the difference is between various instruction sets and what this means in terms of use. They want to know about the many languages . . . which they need to know for hobby systems . . . how to learn more. They want to know about computer games . . . understand them . . . know where to get the programs for them . . . what to read to learn more. Computer music . . . how to get started, how to learn more, what is happening, literature. And computer art . . . ditto all along the line. What about business uses, how do they get programs for that? Suppose they want to get into computer sales and service . . . ?

I hope you get the idea. If anyone asks, we pay for all articles used. We pay on acceptance and pay rather well.

73 – – Wayne Green
Peterborough, New Hampshire 03458

LOWEST RANDOM NUMBER

PCC, I dare you to find a lower random number! This random number popped up one day from an HP 2000F and the people who run the system said it was impossible!

```
HOW MANY? 20200
4.83356E–07

HOW MANY? 100
7.41859E–03

HOW MANY? 1000
1.99115E–04

HOW MANY?
```

Melanie Harvey
1081 Keith Avenue
Berkeley, Ca. 94708

RANDOM NUMBER GENERATOR

Something I forgot to mention yesterday is the teeny-weeny random number generator I wrote when we first did UGUESS on the old PDP8. The strategy should be applicable to core-conscious micro's as well. It relies on interrupts although it can be reworked to do without 'em.

(1) Do all housekeeping, type instructions on TTY
(2) Type first question "WHAT IS YOUR GUESS?"
(3) Turn on TTY keyboard interrupt
(4) Put complement of highest integer to be chosen in accumulator (e.g., for random numbers 1 to 100, put 7634_8 in accumulator).
(5) Enter tight loop: increment ac; if non-zero, goto 5, if zero, goto 4.
(6) Keyboard interrupt – take number in ac, complement it, and VOILA! one random integer – random because the machine instruction cycle in step 5 is way too fast for humans to predict or control.

The machine picks its number while it waits for you to make your first guess. The number is related to the time it takes you to decide and type the first character.

Bill Mayhew
Boston Children's Museum
The Jamaica Way
Boston 02130

ALTERNATIVE PRESS INDEX

The ALTERNATIVE PRESS INDEX is published quarterly by the Alternative Press Centre, Inc., and indexes by subject approximately 120 underground and alternative newspapers, magazines and journals. The format is similar to that of the Reader's Guide to Periodical Literature. Our staff does the indexing using subject headings from to Periodical Literature. Our staff does the indexing using subject headings from our Indexing Guide, which was developed by members of the Centre to meet the special needs of the periodicals that are indexed. Computers are then used to compile the data and publish the INDEX.

The Alternative Press Centre, Inc. is a not-for-profit educational organization formed in 1969 as the Radical Research Center, Carleton College, Northfield, Minnesota. Its goal was to undertake the task of indexing and collecting alternative periodicals of the American and Canadian Left. The Centre was established with the aid of a small grant and is now run on income from subscriptions. For several years it was located in Rochdale College, Toronto, Ontario, Canada but has been recently moved to College Park, Maryland.

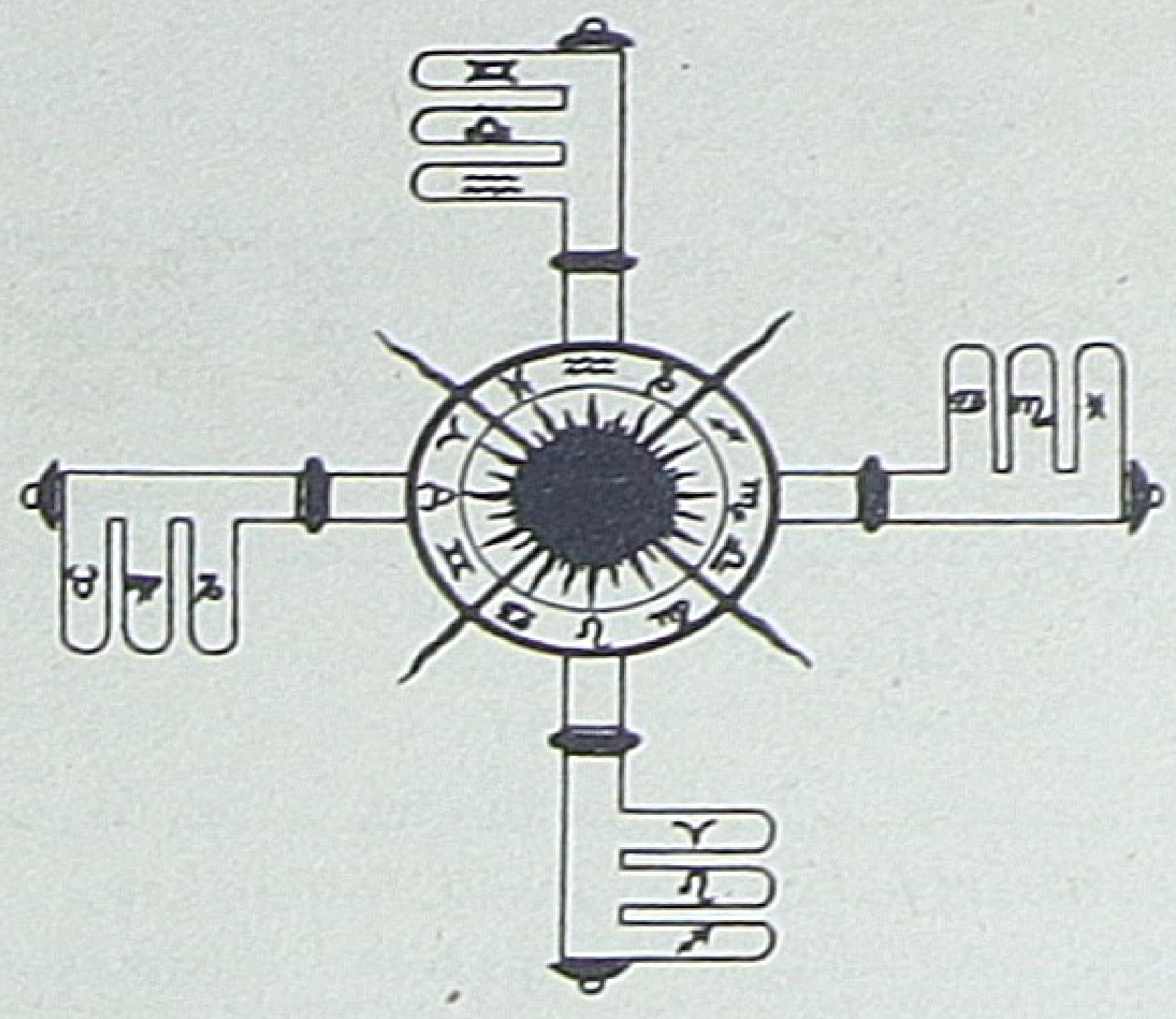
Copies of our subject heading list, which is of use to anyone classifying alternative materials, are available for $2.50. Copies of a list of the periodicals that we are currently indexing, with up-to-date subscription information, are available free upon request. For info, write –

Alternative Press Centre, Inc.
P. O. Box 7209
Baltimore, MD 21218

FORTRAN GAMES – FREE!

I'm going out of business. Since I will hopefully be in some college in 10 months, I'd like to give out my programs while I can. My FORTRAN IV library includes STARS, BAGELS, BUTTON, HURKLE, MUGWUMP, SNARK, BANNER, SUNSIGN, LIFE (2 versions), WUMPUS, HAMURABI, STOCK, TRADER, STAR TREK, LUNAR, REVERSE, TAXMAN, MATNUM, LOVE, and the public CAVES, to name a lot. If anyone is interested, write –

Eric Haines
212 N. Riding Drive
Moorestown, NJ 08057



WANTED: ASTROLOGY PROGRAM

A couple of program requests. Do you have or know of a program that interrogates you about your birth date and other areas and then computes your astrological star chart and/or predicts your accurate horoscope? After all, there are certain calculations that astrologers go through to derive these things after they get specific dates and times from you. Please let me know. Also, your "Biosin" program is cute and interesting and accurate for me in a few instances. However, a very accurate Bio-Rhythm is a several month study where the person records his feelings and physical condition. Then this data is read in and his Bio-Rhythm computed from previous months' reactions. Do you have a program that takes data compiled in this fashion and computes a more precise Bio-Rhythm?

Gary Trapp
310 Julian St.
Denver, Colorado 80219

COMPUTER ART/CHESS IN BASIC

The September issue of COMPUTER BULLETIN (published by the British Computer Society, 29 Portland Place, London W1N 4HU) has a few interesting items:

On page 13 is an article by John Lansdown, *Not Quite Computing – Almost Art*. He discusses several art-generating programs, including SPLASH (listing appears in *Plons* 1972-74 published by Verfindustrie Jac Eyck BV, Heerlen, Holland, Eikenderweg 75) and DRAGON DYCK (listing appears in a recent issue of *Artinfo Musinfo*, published by the Group Art et Informatique of the University of Paris). The same article also mentions *Page*, the bulletin of the Computer Arts Society (also published in France).

In the same issue of COMPUTER BULLETIN is a letter by M.A. Bramer, who mentions that he has a sophisticated chess program running in BASIC. His program embodies a novel pattern-matching method requiring no tree-searching whatever.

J.G. Day
17042 Gunther Street
Granada Hills, Ca. 91344

LIFE IN RPG?

Thanks for the Buyer's Guide in the November issue. For however short a time it's up to date, it will serve as an overall view in an area where one can easily be overwhelmed by the flood of claims. Don Tarbell's cassette interface seems really impressive; 800 BPI is a quite acceptable commercial density for a single data track.

LIFE has gotten around well but programming it in RPG seems beyond the reach of the language (I've programmed LIFE in FORTRAN and know something about RPG). LIFE concentrates on internal data manipulation, at which RPG is poor. Nevertheless, part of the fun of computing is pushing languages to the limit and I would hesitate to proclaim the impossibility of the task. Incidentally, Carl Helmers is also trying to determine the current status of LIFELINE.

One of the programs you might consider for publication is one alluded to in the November issue of *Industrial Research*, article starting on page 52. The program, which determines the complexity of text, is being made available free of charge by General Motors. Appearance in one of your publications could spread it around quite a bit more.

Glenn R. Puro
169 Lafayette Avenue
Geneva, NY 14456

BID RESULTS – STOCKTON UNIFIED SCHOOL DISTRICT

Stockton recently went to bid with a set of specs that essentially asked for a 32 terminal system that could be used in three schools who were setting up a computer lab. The lab will be used for CAI, problem-solving and simulation by a variety of departments. Stockton is under court-ordered desegration rulings and using money from ESAA to make the acquisition. Here are the results. WHICH WOULD YOU CHOOSE?????

ITEM	HP	DEC	DATA GENERAL	ICE†
System name	HP 2000 Access	PDP 11/40	NOVA 3/12	PDP 11/35
Core memory	64K	64K	64K	64K
Disk memory	15 Mbytes	20 Mbytes	2-10 Mbytes	20 Mbytes
Magnetic tape	yes	yes	no	yes
Cash purchase price including 32 terminal capability	$78016	$80454	$51559	$84834
Annual maintenance	$582	$633	$753	$629

Data General's low bid was rejected for the following reasons:

(1) No guarantee of response time of less than 3 seconds
(2) No magnetic tape back-up as required by specs
(3) Extended BASIC does not meet four specified requirements and in general is inferior to those proposed by all other vendors
(4) Limited program library including no math drill and practice and no graphics capabilities
(5) Limited author language
(6) High monthly maintenance
(7) 150 day delivery
(8) Little committment to education – only 5% of DG business.

We'd like to publish more information like this. Send your results in this format and we'll print them!

Contact person – Bill Games, Franklin Senior HS, 300 N. Gertrude Ave., Stockton, Ca. 95205

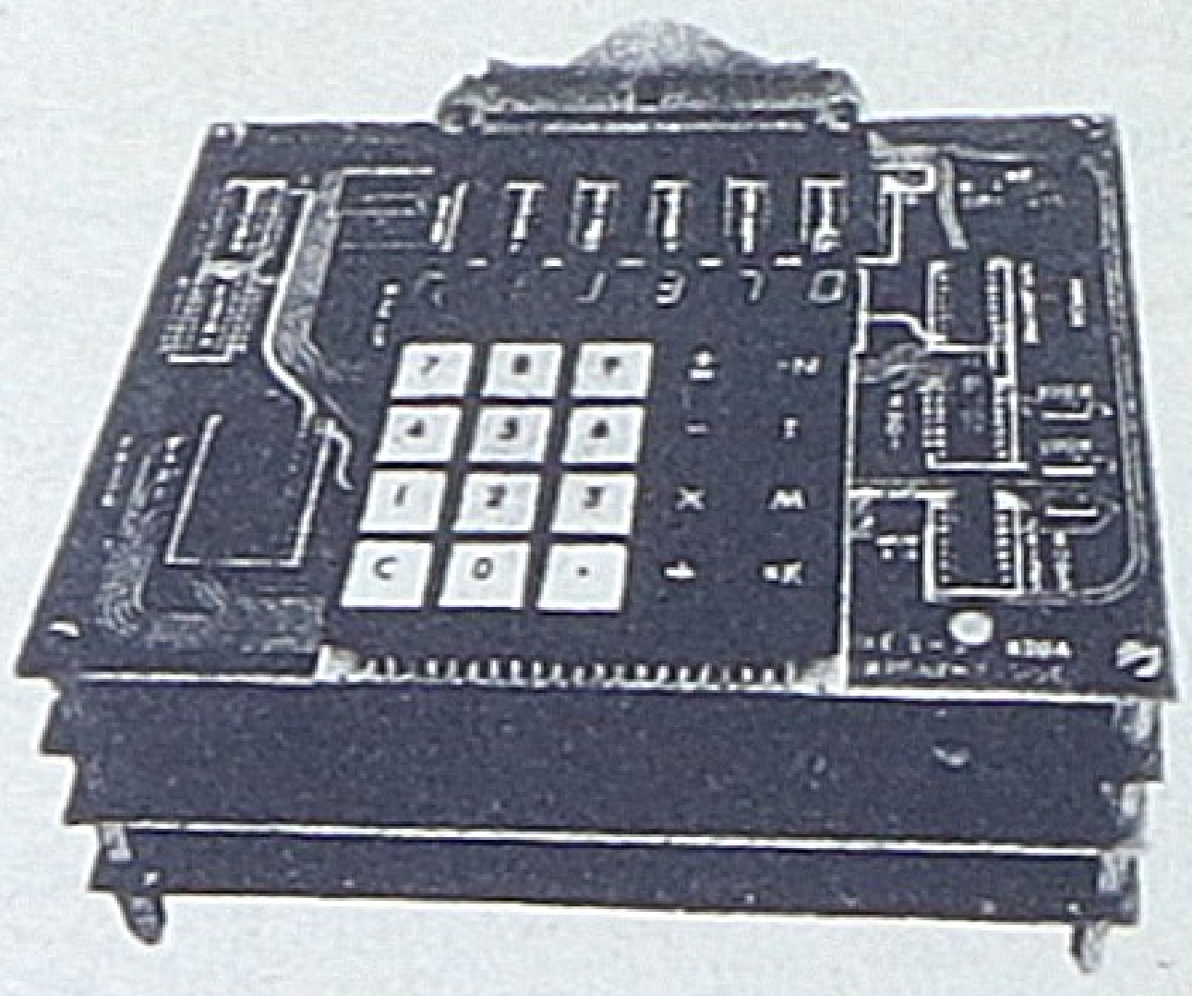
† ICE is a San Francisco based reseller of DEC hardware.

COSMAC

A letter from Bobby Baum in Vol. 4, No. 2 of PCC states that COSMAC is the most expensive computer he knows of. He has been smoking something that good dragons shouldn't smoke. COSMAC costs $40 (quantity one) which makes it one of the least expensive, as well as easiest to use microprocessors available. Bobby goes on to extoll the virtues of COS/MOS so I don't have to repeat them here. Perhaps the fact that Bobby is a thinker rather than a doer prevents him from checking facts before knocking some doer's superior product in public.

Joe Weisbecker
1220 Wayne Avenue
Erlton, Cherry Hill, NJ 08034

ATTENTION MIKE OWNERS!



Over 100 pages of hardware design and software listings are available in MIKE Information Packet Number One. Included are theory, operation and design of interfaces with specific designs for cassettes, modems, TTY 33ASR, RS232, and CREED; count-down circuit, push/pop stack; and swap registers. Over 50 pages of software listings are included with programs for keyboard and display testing, memory test, digital clock, conversion of hexadecimal keyboard to 64 keys, cassette monitor CREED I/O routines, and "Super Nim" game. Much of this information can be used on any 8008 based system with appropriate changes in the I/O assignments and the bus structure. To receive all of the above, please send a $5 check to

Jim Farschon
3949 Mt. Everest Blvd
San Diego, Ca. 92111
(714) 292-9180

WORKSHOPS

TIES – Total Information for Educational Systems is a cooperative effort among Independent School Districts in Minnesota. The enrollment of member districts is in excess of 260,000 students. TIES employs advanced systems concepts and computer technology to support the functions and operations of individual districts.

In October 1974, in cooperation with the Council of Chief State School Officers, the Office of the Deputy Commissioner for the Bureau of School Systems, USOE the Minnesota Department of Education and the Minnesota Educational Computer Consortium, the staff of TIES presented an Orientation Workshop to representatives from almost every State and Territory. In response to requests for further workshops the Minnesota School Districts Data Processing Joint Board has elected to offer such workshops on a regular basis. Contact TIES, 1925 West County Rd. B2, St. Paul, Mn. 55113.

ON-LINE

A buy and sell forum for the computer hobbyist. ON-LINE is a classified advertising newsletter for computer hobbyists who want to buy, sell, or swap hardware, software, services related to small business, home or personal use of computers. Get your free sample from

ON-LINE
D.H. Beetle, Publisher
24695 Santa Cruz Hwy.
Los Gatos, CA 95030

RIKER-MAXSON TERMINAL

A friend and I recently entered the micro-computer world with the purchase of an Altair. We also ordered a Riker-Maxson "terminal" from MiniMicro Mart in New York, along with their PIO board and TVT III board and ASCII encoder board.

The Altair hardware was good quality for the most part, but assembly instructions were fair to poor! Several parts were missing (but could easily be obtained from many local supply houses). The hardware failed to function on initial power up and required several hours to debug. Most problems were traced to errors in the assembly instructions whose applicable errata sheets were somehow overlooked! Only one IC was bad. The proliferation of jumper wires required indicates that someone could have done a little more homework, but considering price and performance its not a bad deal.

Regarding the Riker-Maxson terminal acquired at considerable aggravation from MiniMicroMart It is a nice piece of equipment but will require some resourceful additions and aterations to achieve a successful interface with Altair. We received the terminal shortly after we ordered it, in reasonably good condition (some rust on the heavy cast frame). It took several days for the distinct odor of "dankness" to disappear! These units have apparently been in storage for some time!

The keyboard was made by Micro Systems and is very nice. The output is five level Baudot which should be hardware converted to ASCII for best interfacing. MMM (MINIMICROMART) was to have supplied the converter hardware for only ten dollars; BUT so far they have failed to do so. They did send a parallel I/O board with parts (minus a few capacitors) that works OK for interactive type interfacing and they provided a circuit diagram and a sort of pictorial assembly guide. The instructions were very brief and contained an error regarding the on board power supply regulator hookup. Stuff obtained from MMM is definitely NOT for the inexperienced (or impatient) builder.

We have converted our terminal to ASCIII using a 2K PROM and a couple of TTL's. The modified keyboard is now capable of generating almost the entire ASCII set, including both upper and lower case alphabet. We also have software for using the terminal in an interactive mode which we will send to anyone who sends us a SASE. Those of your readers who have purchased the R-M terminals and are having trouble getting them operational (MMM is little or no help) can write to me and I will send diagram and PROM truth table for making the ASCII converter at no charge. Parts cost is about $25.

I recommend purchase of the R-M terminal to those who would like a cheap substitute for commercially available units and have the electronic skills to implement operation. We intend to purchase a used model 33 printer to install in our R-M terminal (cost: $350 to $500) which has the space and built in power hookup for it. This would provide a good and cosmetically attractive substitute for ASR-33 TTYs. I believe the people at MMM are basically honest, but not in a position to deliver most of what they advertise.

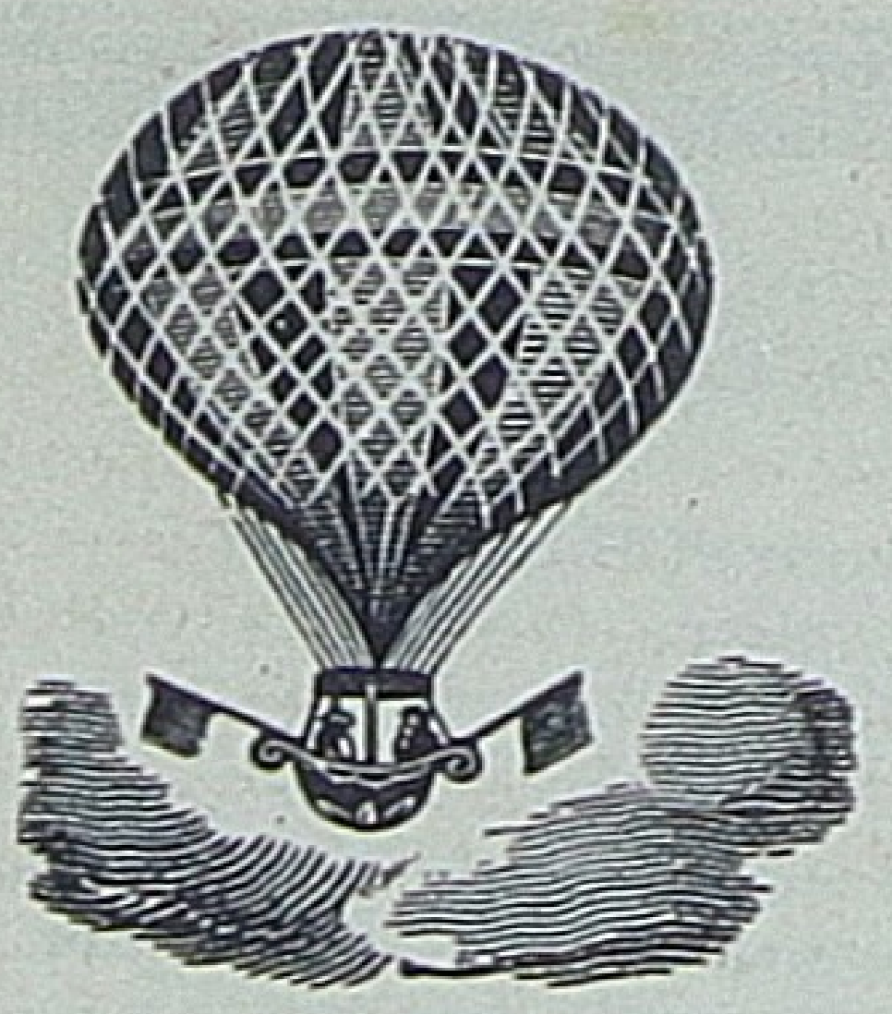
To our knowledge, MITS is the only company that has delivered any substantial quantity of merchandise with any semblance of regularity!! By the way, their BASIC software is the best and most incredible software value ever offered!!! It makes their hardware the leader by 20 megabytes! (I.E., if your personal integrity prevents you from ripping them off – which I hope it does.)

Our plans for the future include development of some sort of compiler for use on 8080 based systems to generate accounting and minor data processing operations for small businesses. We hope to establish a "micro-software" house. We firmly believe that micro-technology has made small computers a very viable product for small businesses and the software demands will become astronomical in a few years.

Although we intend to profit by use of micro-computers we also firmly believe in the concepts of computer power to the people as outlined in earlier issues of your magazine. The dawn of a new age is nearing and its exciting to be a part of it. We wish you continued success and best wishes for the New Year.

Stephen M. Freeman
Mark Sumner
No. 18 University Heights
Hopkinsville, Kentucky 42240

COMPUTER FAIR



To be held at the White Plains Public Library

It's Time for student computer fans to start working on their projects for the Hudson Regional Computer Fair, which will be held on March 27, 1976 at the White Plains Public Library.

The Hudson Regional Computer Fair is a preliminary fair to the 1976 National Student Computer Fair, which will be held in June 1976 at the New York Coliseum. These computer fairs are intended to promote and encourage the imaginative use of computers by elementary, middle, and high school students.

Any project which relates in some way to the world of computers and computing can be entered in the Fair competition. You can use a computer to draw a picture or you can draw a picture of a computer. You can design a game, build a computer, write a story, prove a theory, create a tool for the home or school, express an opinion, write a program, explore the economy, develop a code, simulate an event, compose a tune, or solve a problem.

Projects should fit into one of the following nine categories:

- Computer Art – Graphics, Film, Music, Sculpture
- Computer Games
- Computer Tools for the Home
- Computer Tools for the School
- Application Programs – Business, Math, Science, Humanities, etc.
- Computer Science – Systems software (compilers, interpreters) algorithms, etc.
- Construction and Hardware
- Computing Milieu – History of computers, social implications etc.
- Other

The White Plains Public Library has been selected as the site of the Hudson Regional (Westchester, Putman, Rockland, Dutchess, and Fairfield counties) Computer Fair, since it houses the only public-access computer in the Metropolitan area. This fair is sponsored by the Library, Comput-O-Mat Systems, and Wang Labs. Comput-O-Mat Systems provides the system support for the Library. Wang Labs has provided their 2200B computer.

Entry blanks and guide lines can be obtained at the Reference Desk of the White Plains Public Library, located at 100 Martine Ave. in White Plains.

Additional information and entry blanks for educators can be obtained by calling Mrs. Harriet Shair at (914) 967-7853.

SNOBOL FOR THE ALTAIR?

Thanks for the great publication and other nice things – like dragon shirts! What a way to learn.

I have a problem. Without considering any possible consequences, I have committed myself to writing a SNOBOL compiler (interpreter?) for an ALTAIR 8800. My officemate has built the ALTAIR for the college at which he teaches and after many months of promising some kind of assistance, I finally offered to write a compiler.

To get to the point: does anyone out there have any experience in compiler writing, particularly in SNOBOL compiler writing? I know that some of the sharpest people in this field read PCC, so I'm really hoping to hear from someone.

Of course, once I get the compiler working, I will make it available to other ALTAIR owners and users (for a nominal fee and a lot of glory).

(I realize all you people are heavily into BASIC, but SNOBOL is a pretty neat language for things like compiler writing, natural language translation, and general string manipulation.)

Also, since my friend's ALTAIR is 75 miles away from my home, donations of ALTAIRS will be accepted.

Maureen R. Supple
828 So. Irving St.
Arlington, VA 22204

IF EVERY CHILD OWNED A COMPUTER

I'm very excited about home/personal computer possibilities. I want to expose my daughter early, as well as my wife, friends, neighbors, anyone! (San Francisco Sidewalk who?) But the wait-for-the-weekend, nowquicklet'sdoallwecanbeforeourhourisup approach through a public time sharing system such as the one at LHS just isn't the ideal approach. Now if computers were as common and accessible as TV's! I believe it was either Seymour Papert or Alan Kay who said something like "if every child owned a computer, computers would be cheap enough so that every child could own a computer." I might as well pitch in and help!

More power to tiny basic!

Bob Rickard
2305 Parker Street
Berkeley, Ca. 94704

COLA

ANNOUNCES ITS FIRST ANNUAL MINI–CONFERENCE ON THE USES OF COMPUTERS IN EDUCATION

FEATURES WILL BE:

- How to get the computer to work for you
- Speakers and workshops on CAI, Data Processing, Management Systems, Programming, and others
- Awarding of prizes for COLA's programming contest for junior and senior high school students
- Exhibits by vendors of computer hardware and software

DATE: March 6, 1976
LOCATION: Le Conte Junior HS (in Hollywood)
TIME: 9 AM – 2 PM

For additional information, write: COLA, P. O. Box 43677, Los Angeles, Ca. 90043 or contact Richard Moffie, Edison JHS, 6500 S. Hooper Ave. Los Angeles, CA. 90001.

SEATTLE COMPUTER CLUB

A Seattle based computer club is in the works. Call Steve Herber (206) 329-1994 or Bonnie deTurk at the Pacific Science Center (206) 624-8140.

Steve Herber
2362 Franklin East No. 402
Seattle, WA 98102

NASA/JSC COMPUTER CLUB

Just about a year ago I built the RE MARK-8 and I have subsequently added the SWTP TVT II and the Digital Group's tape cassette interface. All run just fine.

Since several of us in this area are interested in home computers and microcomputer projects, we have formed the NASA/JSC (Johnson Space Center) Computer Hobbyist Club. It is a sanctioned club under the JSC Employees Activity Association. Presently we have over thirty members who are NASA or contractor employees. They range from interested beginners to computer professionals and include an astronaut.

We meet twice a month at JSC and we have plans for beginner's educational lectures, club projects (possibly a computer center), surveys of the home microcomputer market, group purchases, and information exchanges. Since we have a large, enthusiastic group I'm sure we will be successful at all these projects.

Further information on our club and activities can be addressed to me

Marlowe D. Cassetti
1011 Devonport Ln
Seabrook, TX 77586

WISCONSIN COMPUTER HOBBYISTS

I certainly enjoy my subscription to the PCC Newsletter. I am sure you will keep up the good work.

Would appreciate your listing in the next issue the formation of:

WISCONSIN AREA COMPUTER HOBBYISTS

Don Stevens
P. O. Box 159
Sheboygan Falls, WI 53085

ASIS

A Prediction from 1966 –

A "Model T" for the Mind.

But the story isn't finished yet. There is a computer manufacturer around somewhere who is alert enough to look beyond the next million dollar contract. He will develop the "Model T" computer. It will have four registers, one unbuffered I/O channel, an optional flashing light for those who wish to impress their friends a rustic but sturdy peripheral unit, germinal software support, and a price tag under one thousand dollars. But it will compute – will do, in fact, with a little judicious coaxing essentially anything its huge and expensive relatives can do, though perhaps a bit more slowly. And within its own design purpose, it will outclass the most sophisticated system pooled human intelligence can devise, because it will be totally available to the individual user's ingenuity.

That computer will usher in the true era of automation.

from: "The Human Value of the Computer as an Educational Tool" by Francis M. Wheeler.

Reprinted from Proceedings of the American Documentation Institute. 1966. Copyright 1966 by American Documentation Institute (now the American Society for Information Science), Washington, DC. Reprinted by permission of the copyright owner.

THE FAMILY ALTAIR

I am now receiving PCC on a regular basis. Like it very much and find it both interesting and helpful. Lee Felsenstein's article on the Altair problems in the last issue was particularly helpful. I have a 10 year old son, and two daughters ages 8 and 3 who have all become computer addicts (yes, even the three year old has to have a program she can use to type on the TVT). Your Number Guessing Game was the first program we ran and I had to stay up until midnight to put Mugwump on. Allocating computer time is as big a problem as it is at work. Your publication and philosophy have contributed to our enjoyment and will continue to do so. The kids are working their way through your book *My Computer Likes Me* and have picked up the basics of programming rapidly. We went through many of your Inchworm examples and they were fascinated. Keep up the good work! We appreciate your efforts.

Don H. Morrison
32200 Arlington
Birmingham, MI 48009

CACHE

We have now combined all the groups in and around Chicago into one, and changed the name to CACHE, (Chicago Area Computer Hobbyists' Exchange).

Our mailing list has grown to 170, and meeting attendence to over 60 in only 4 months of operation. Thus far we have had only monthly meetings (which have been mostly gabfests) and no newsletter to speak of – just meeting announcements. Now that we are getting organized, with dues, P.O. Box, officers and planned meetings, we will have to begin putting out a "newsletter" of some kind too.

Things are happening all around. The newsletters from the California groups are particularly exciting, and I think PCC is really great. It is hard for us in the "heartland" to know what's going on out there, since it changes so much from month to month.

Our next 3 meetings will feature speakers such as Ed Roberts from MITS, Dave Larsen (one of the Bugbooks authors), and a Motorola applications engineer to talk about the 6800.

CACHE
Bill Precht
P. O. Box 36
Vernon Hills, IL 60061

An Introduction to Microcomputers

Adam Osborne & Associates, Inc.
1975, 384pp., $7.50

Available from PCC Bookstore

People call PCC and ask for a book which is a good introduction to microcomputers. Previously we have had to say that there really isn't one - but now there is - and this is it.

Adam Osborne Associates are excellent technical writers (they write manuals for many of the major manufacturers.) so their book might be expected to be informative and technically competent. If that were all, it would still be well worth buying, but this book is also that rare gem, a book which not only says 'This is so' but also explains to you *why* it should be so.

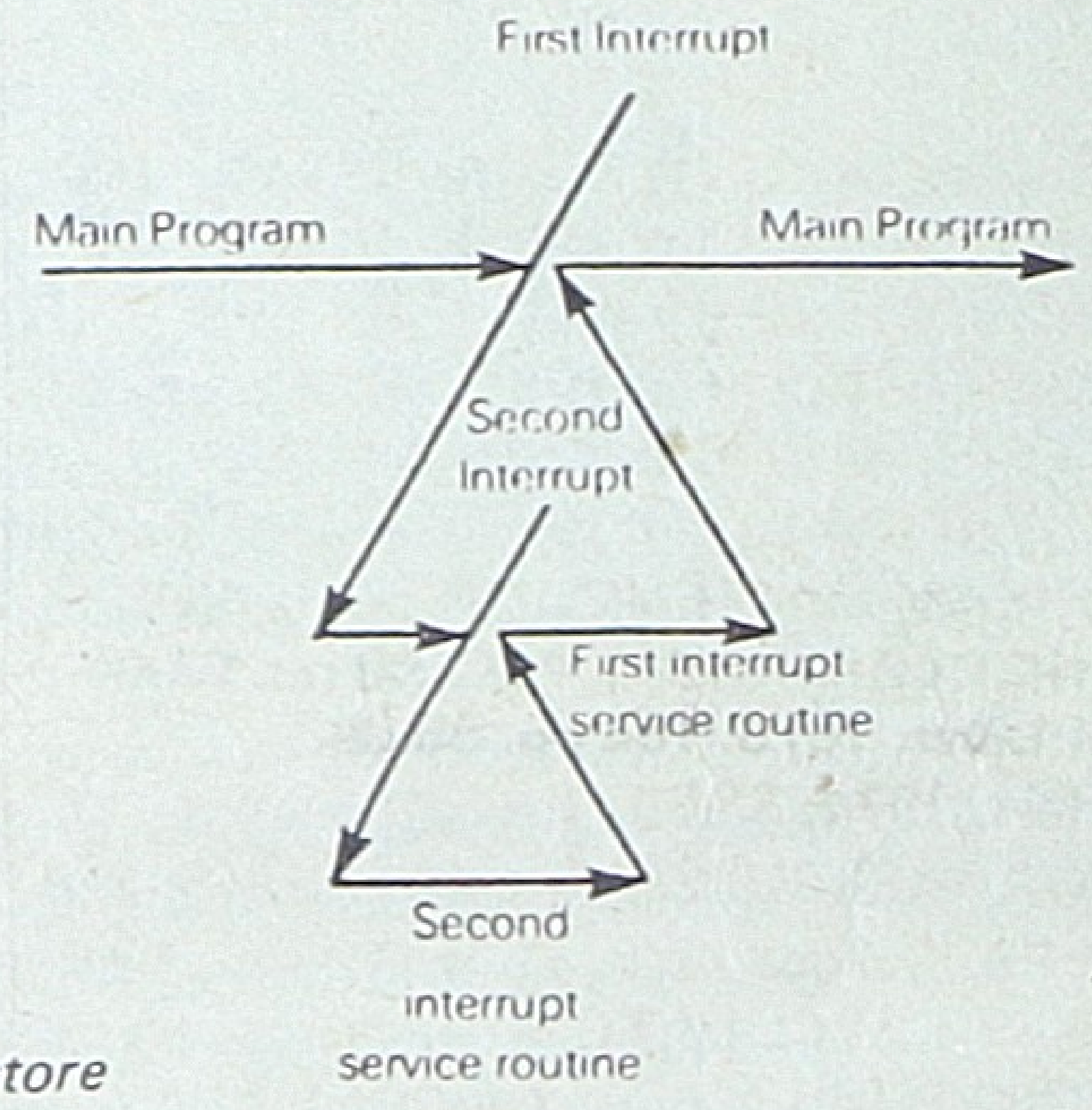
The book starts with an introduction which shows how computers evolved and the mathematical and logical basis upon which the hardware is built. This leads naturally to a discussion of the overall architecture and organization of a practical computer, and thence to a detailed study of the contents of a CPU. Most writers would quit at this point and go on to software but, the authors thoroughly understand the devices they are writing about. The next chapter is on logic beyond the CPU.

For a device as small and cheap as an LSI CPU chip, the whole point of its design may lie in the way it interacts with external logic devices, and the economics of its use in a given application be primarily a function of its need for, or the availability of, the necessary support chips. No one has really spelled this out before - certainly not with the clarity of this book.

Clarity is also the keynote of the chapter on programming - a superb explanation of the interaction between software and the CPU architecture. Particularly this chapter is a reference for anyone who has any question regarding addressing methods and terminology. The remainder of the 400 or so pages in the book is devoted to a canny look at most of the presently available CPU chips. Unfortunately omitted are COSMAC, the MOS Technology 6500 series and TI's 16 bit chip, but they will be covered in later books and the general information is so well done that owners of the chips will still learn a lot about them.

Buy this book - it's a class better than any other we have seen.

4) The program which gets executed following step 3 may optionally contain an Enable Interrupt instruction. If this instruction is present, another interrupt may be processed, before the current interrupt has completed execution, as follows:


First Interrupt
Main Program
Main Program
Second Interrupt
First interrupt service routine
Second interrupt service routine

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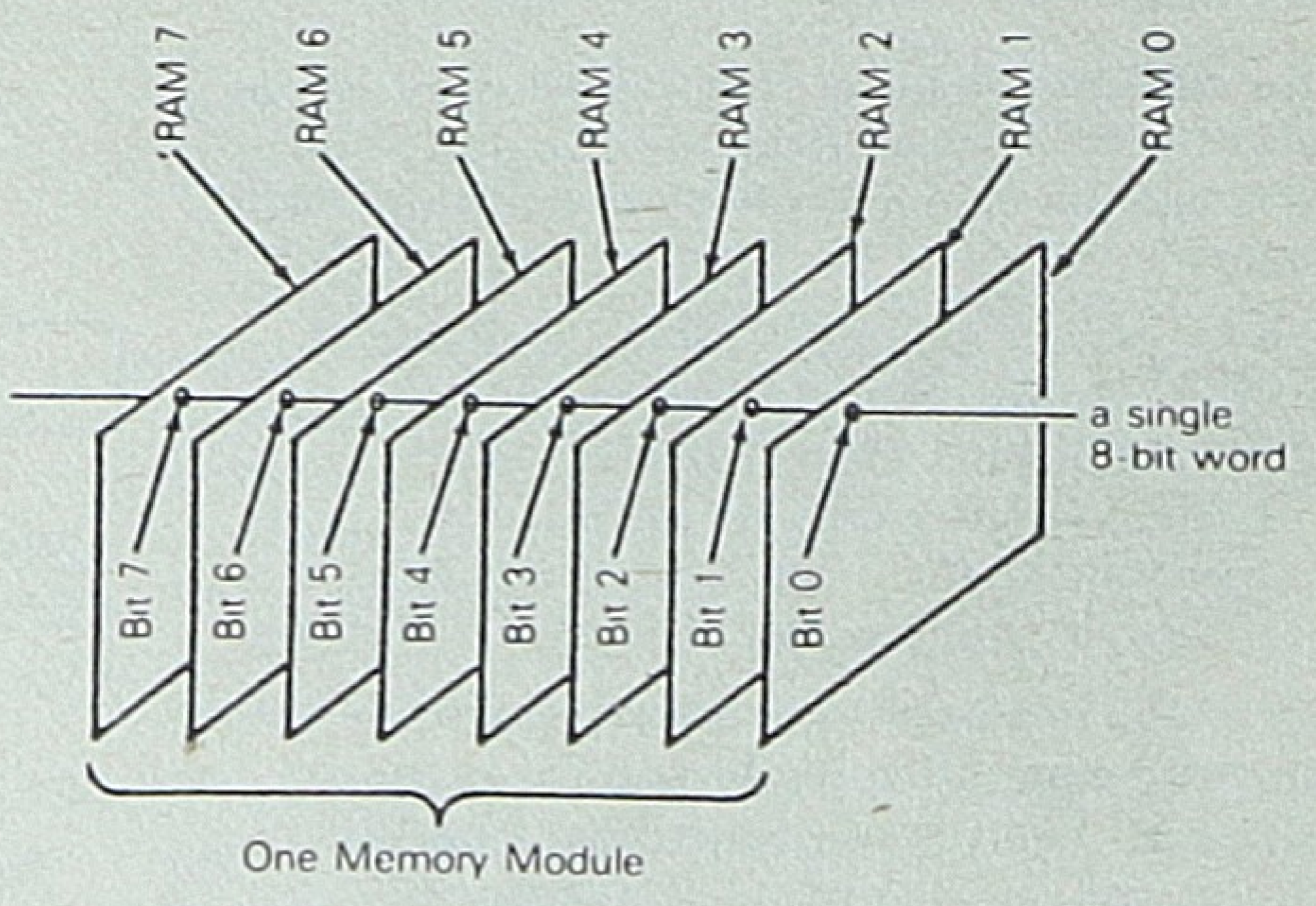
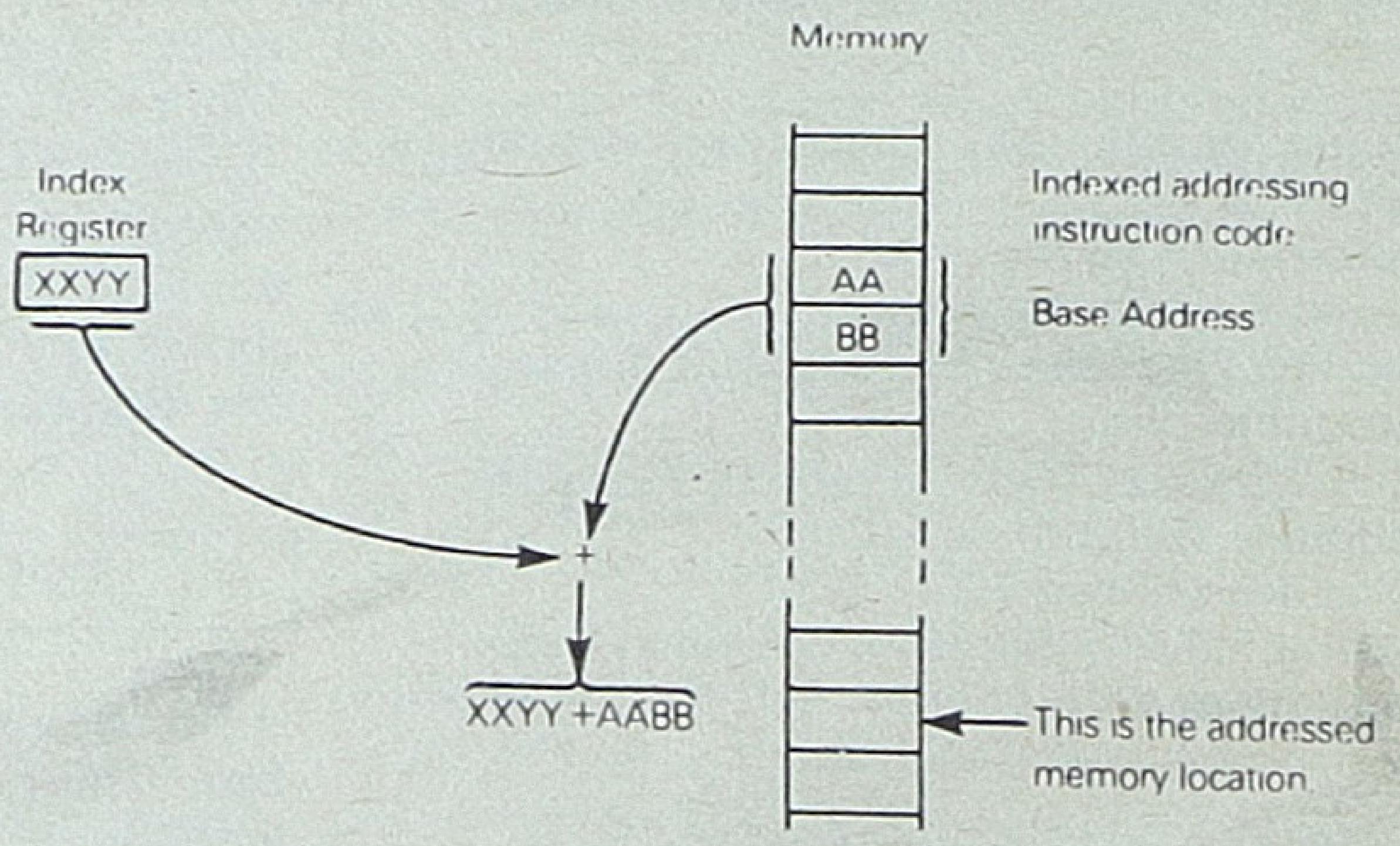
Read-write memory requires more logic than read-only memory, since the individual bits of a read-write memory can be changed as well as being read. Therefore, read-write memory is commonly implemented on more than one chip. In a very simple case, eight RAM chips may implement 8 bit read write memory words, with each chip contributing one bit of the word:



MICROCOMPUTER INDEXED ADDRESSING

An 8-bit word size is the feature of microcomputers which dictates how much indexed addressing, if any, will be implemented.

Let us begin by looking at indexed addressing in its simplest form. For an 8-bit microcomputer, this may be illustrated as follows:


Memory
Index Register
XXYY
Indexed addressing instruction code
AA
BB
Base Address
+
XXYY+AABB
This is the addressed memory location

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Programming Proverbs

By: Henry F. Ledgard
Hayden Book Co., 1975, 144pp., $5.95

FROM THE PREFACE

Several years ago I purchased a small book called *Elements of Style* written by William Strunk, Jr. and revised by E. B. White. Originally conceived in 1918, this book is a manual on English style. It is noted for its brevity, rigor, and deeply rooted faith in concise, clear English prose. I have read this manual several times. Each time I am again challenged to write better prose. In part, that small book is the motivation for this work.

When I began teaching courses on programming languages, I was struck by the tremendous need for style and quality in student programs. Reminded of Strunk's little book, I became concerned with the need to motivate an interest in program quality. I believe that introductory programming courses should be intimately and overtly concerned with elements of style in computer programming. This concern was brought to fruition in the summer of 1972, when the basic draft of this book was written. It was meant as a brief for people who write computer programs and who want to write them well.

Henry F. Ledgard

This is 134 pages of proverbs to help the programmer become a better programmer. Looking like a thick *Old Farmer's Almanac* , it contains 26 proverbs such as "Think first, program later, avoid tricks, and don't be afraid to start over."

Computer—Aided Experimentation

By: Julis Finkel
1975, 422pp., $24.95
Available from:
John Wiley & Sons
605 Third Av.
New York, N.Y. 10016

This book has a subtitle "Interfacing to Minicomputers". The author's definition of minicomputers easily includes the microcomputer now in the hands of hobbyists.

The book was written to be a text book for a college level course. It is well organized and is very easy reading. The book assumes little knowledge of computers, and if you read from the start of the book you will run into an explanation of all jargon before it is used in the text. Example: the first time "I/O" is used it is given as "Input/Output(I/O)".

Like the text the illustrations in the book are well done and follow the text closely.

All discussion of signals to and from experiments are about the signal and how they relate to the computer and not about the experiment. Starting with a chapter covering the overall contents of the book, the author explains in detail the types of signals and peripheral devices which could be used. Of particular interest are the chapters on analog signals (chapter2), analog to digital conversion (chapter4) and position encoding (chapter6). Chapter 20 is titled "Further Reading" and is a list, organized by topic, of available publications and literature and their sources.

Chapter 19 describes a standard modular interface design which is used mostly by nuclear physists and mostly in Europe. Even if you are not interested in standards, you could read this anyway as it is only about 10 pages out of 420.

There are no directly usable circuits in the book but in many cases all that would be required is assigning values to the blocks in diagrams to make useable interfaces.

This book is both interesting and useful and only the price $24.95 will keep it out of the hands of the hobbyists.

BOB MULLEN

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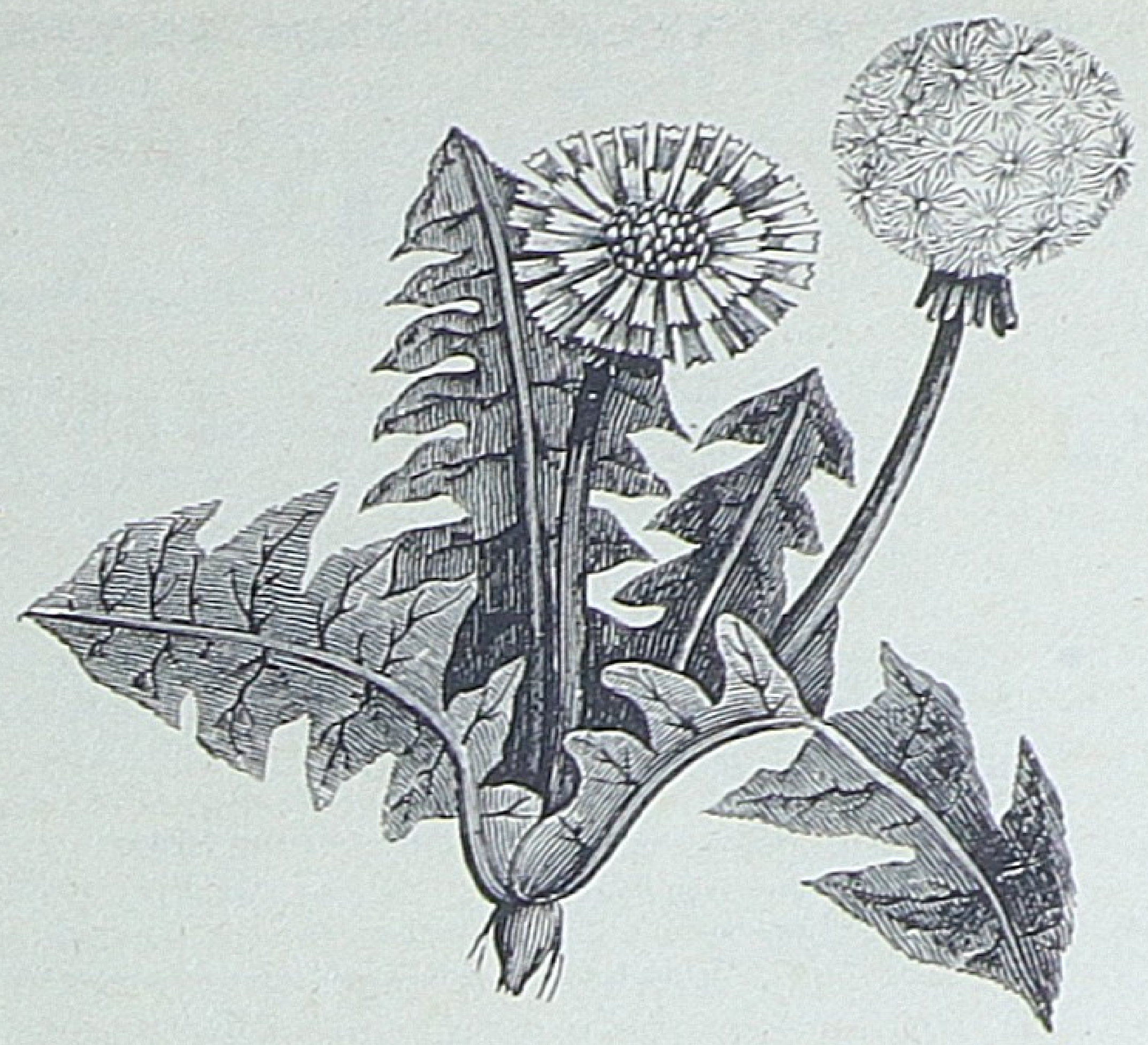

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Bugbook 3 reviewed

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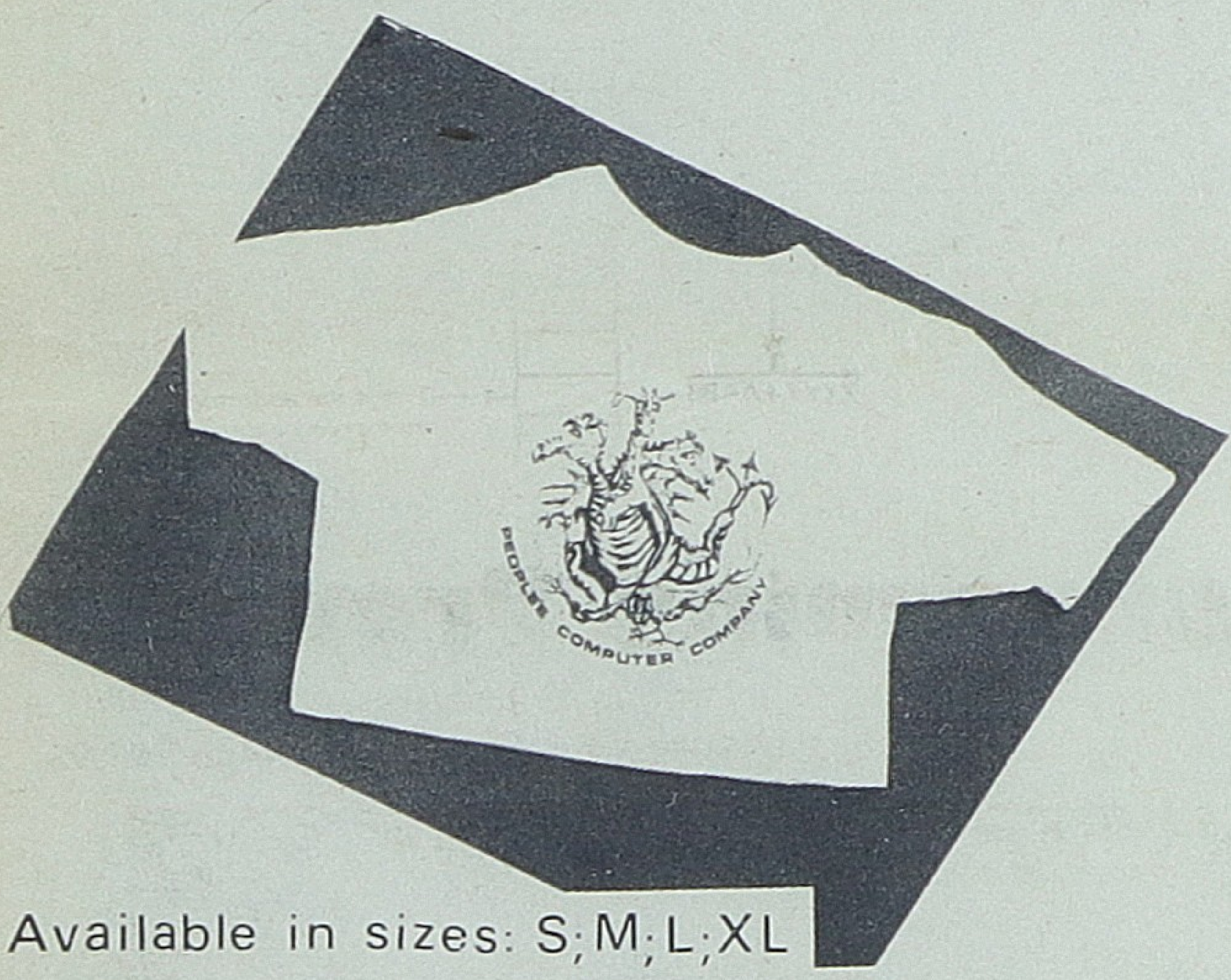

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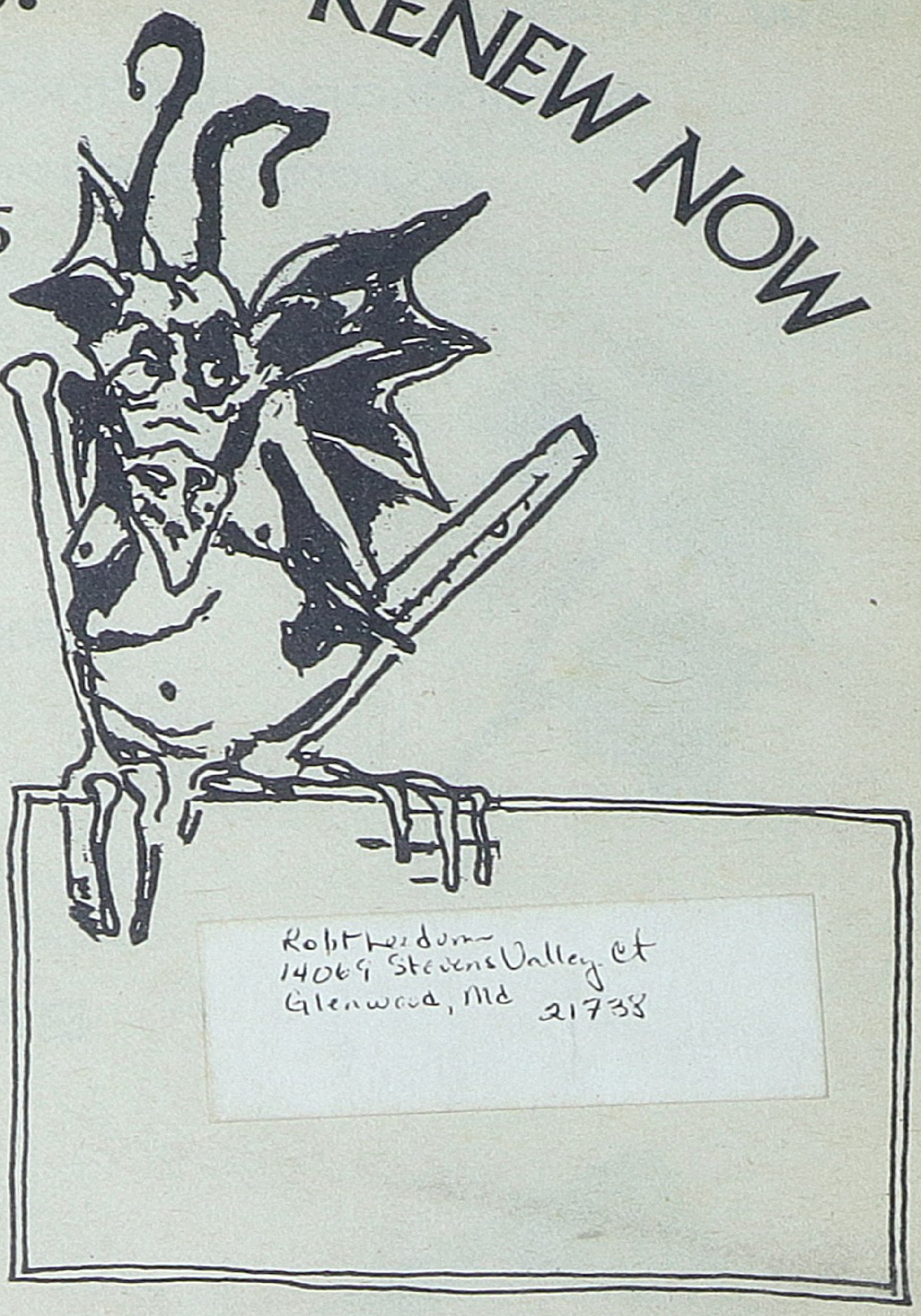

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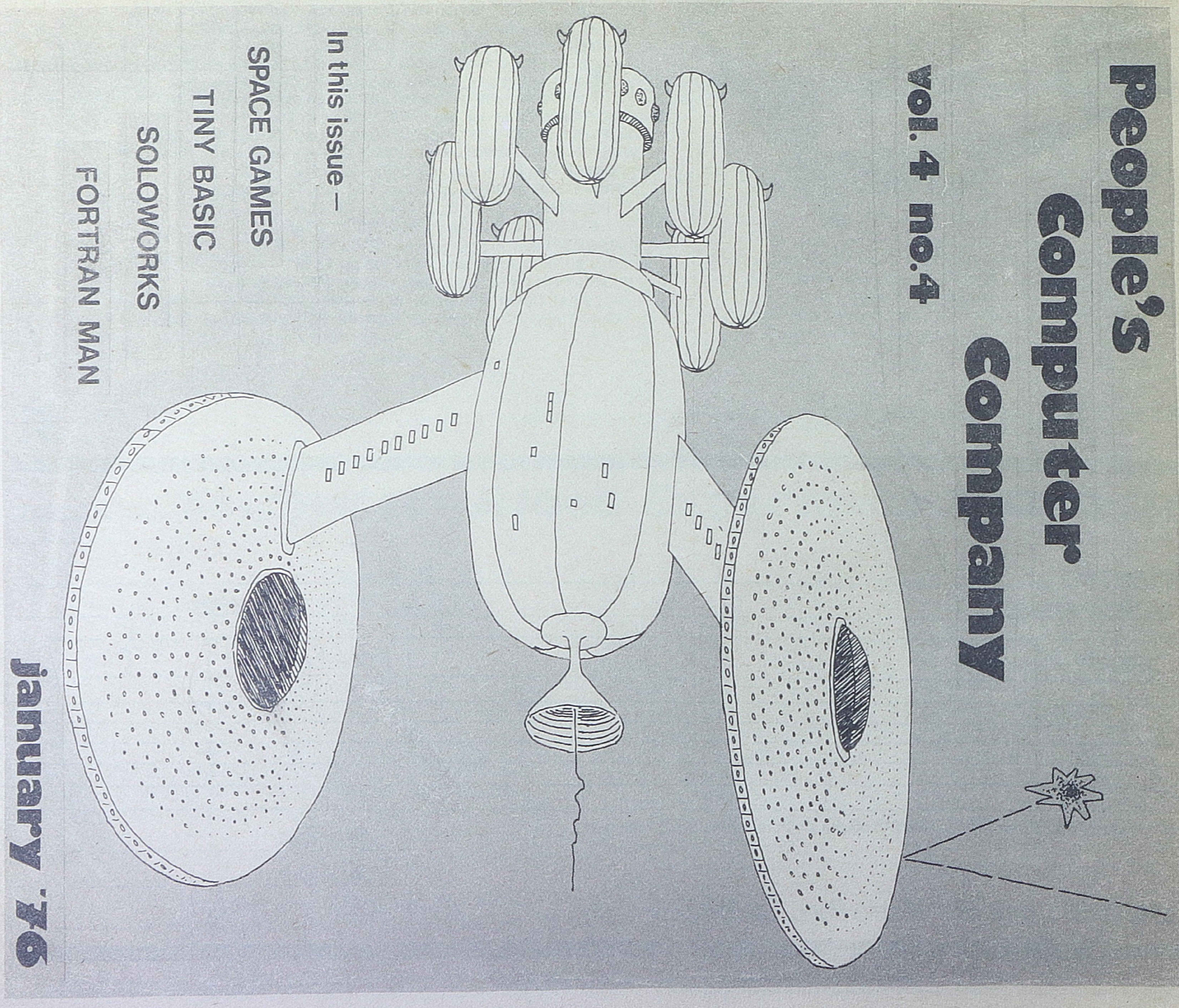

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january '76